

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2019/1027

Date: 6 JAN 2020



Premise

HONEYCOMBES PROPERTY GROUP

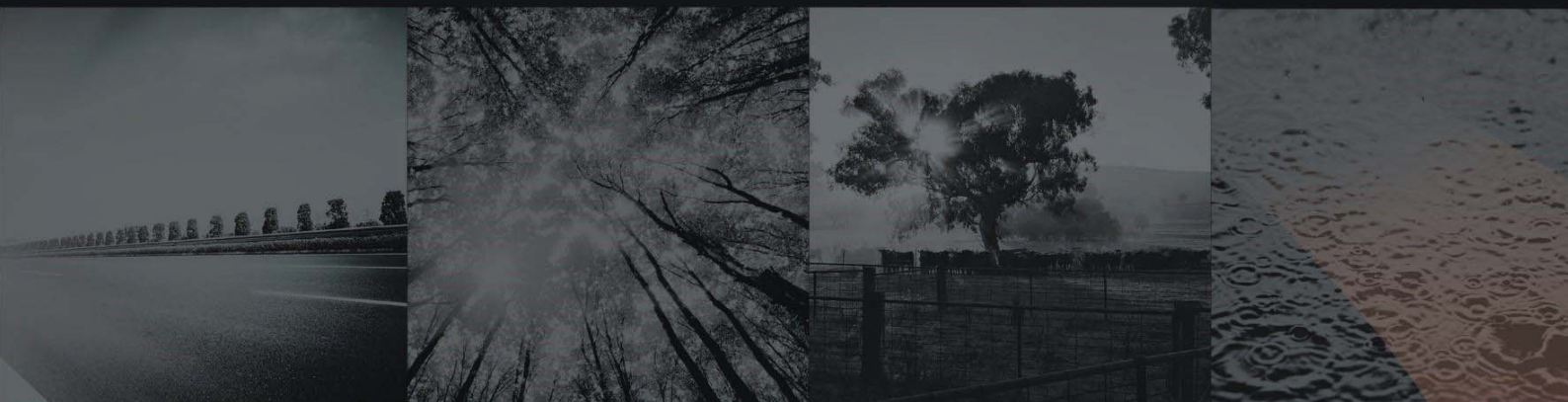
**TOWNSVILLE MARINE TOURISM PRECINCT
FERRY TERMINAL**

CONSOLIDATED TRAFFIC ENGINEERING REPORT

Report No: HON0031/R03

Rev: A

Date: 3 September 2019



ENGINEERING



ENVIRONMENT



AGRICULTURE



WATER

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DOCUMENT AUTHORISATION					
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1 INTRODUCTION

Premise Australia Pty Ltd (Premise) was engaged by Honeycombes Property Group (Honeycombes) in November 2018 to provide traffic engineering services for proposed development located at the Townsville Marine Tourism Precinct, Sir Leslie Thiess Drive, Townsville City. Since being engaged, the development proposal has been revised multiple times and Premise has produced a series of reports and letters addressing different traffic engineering aspects of the development. This report:

- Consolidates previous Premise' documents;
- Updates them as required for consistency with the architectural plans dated 30 August 2019 attached as Annexure A;
- Responds to Revised Submission Requirements issued by Economic Development Queensland (EDQ) on 9 August 2019 attached as Annexure B; and
- Response to the email from EDQ to Honeycombes dated 30 August 2019 regarding Amendments to the Service Lane attached as Annexure C.

The previous Premise documents consolidated within this report are:

- Traffic and Transport Impact Assessment (HON0031 R01-revB) dated 17 April 2019, attached as Annexure D;
- Desk-Top External Road Network Impact Assessment (HON0031-L02-JTP) dated 17 April 2019, attached as Annexure E;
- Response to DEV2019/1027 "MEDQ Information Request and Notification Not Required Copy" (HON0031-L03-JTP) dated 25 June 2019, attached as Annexure F;
- Public Passenger Transport Assessment (HON0031 R02-revA) dated 17 July 2019, attached as Annexure G;
- Addendum to Traffic and Transport Impact Assessment (HON0031-L04-BIJ) dated 17 July 2019, attached as Annexure H; and
- Addendum to Traffic and Transport Impact Assessment (HON0031-L05) dated 27 July 2019, attached as Annexure I.

1.1 Background

In late April 2019, Premise's Traffic and Transport Impact Assessment (Annexure D) and the Desk-Top External Road Network Impact Assessment (Annexure E) were submitted with a development application for land on the northeast corner of the Strand / Sir Leslie Thiess Drive intersection.

Economic Development Queensland (EDQ) responded to the development application with:

- Information Request and Notification Not Required letter dated 18 June 2019; and
- Further Issues letter dated 24 June 2019.

Both above letters are attached in Appendix A of Annexure G.

The Response to DEV2019/1027 "MEDQ Information Request and Notification Not Required Copy" (Annexure F) was produced in response to EDQ's Information Request letter of 18 June 2019 and prior to Premise receiving the Further Issues letter dated 24 June 2019.

On 5 July 2019, EDQ facilitated a meeting between Honeycombes' project team and Townsville City Council (TCC) to discuss the Response to DEV2019/1027 "MEDQ Information Request and Notification Not Required Copy" (Annexure F) and the Further Issues letter. At this meeting:

- TCC instructed that:
 - o peak hour traffic forecasts produced by the Townsville AIMSUN Integrated Model (TAIM) for December 2018 (attached in Appendix E of Annexure G) were to be adopted as current 'without development' traffic;
 - o Design life analysis is not required for the development due to road network upgrades which would be provided by the Hive development over the next 10 years;
- EDQ confirmed that the Desk-Top External Road Network Impact Assessment (Annexure E) provided adequate assessment of non-frontage roads and no further assessment was required.

In response to the Further Issues letter dated 24 June 2019 and the meeting of 5 July 2019, Premise produced:

- Public Passenger Transport Assessment (Annexure G); and
- Addendum to Traffic and Transport Impact Assessment dated 17 July 2019 (Annexure H).

The Addendum (Annexure H) also identified how changes to the development proposal in response to the EDQ letters affected the assumptions and conclusions of the Traffic and Transport Impact Assessment (Annexure D). Considering EDQ's comments at the meeting on 5 July 2019, the effect of changes to the development proposal on the wider road network (as documented in Annexure E) were not discussed in the Addendum.

Following the finalisation of the Public Passenger Transport Assessment (Annexure G) and the Addendum to Traffic and Transport Impact Assessment (Annexure H) on 17 July 2019, the architectural plans were amended and reissued on 22 July 2019. The Addendum to Traffic and Transport Impact Assessment dated 22 July 2019 (Annexure I) confirmed that the amendments made to the architectural plans did not change the conclusions of the Premise documents finalised on 17 July 2019 (Annexures G and H).

On 6 and 7 August 2019, EDQ facilitated workshops involving Honeycombes' project team and project stakeholders to resolve key outstanding issues. As a result of these workshops EDQ issued Revised Submission Requirements on 9 August 2019 (Annexure B).

Premise understands that further discussions have occurred between Honeycombes, EDQ and the Department of Transport and Main Roads (TMR) which ultimately resulted in the email regarding Amendments to the Service Lane dated 30 August 2019 (Annexure C).

Based on the EDQ workshops and the Honeycombes / EDQ / TMR discussions, Bureau Proberts / Counterpoint issued revised architectural plans dated 30 August 2019 (Annexure A).

1.2 Scope and Study Area

In response to EDQ's Revised Submission Requirements (Annexure B) and the Amendments to Service Lane email (Annexure C), this report consolidates previous Premise' documents (Annexures D to I) and updates them as required for consistency with the architectural plans dated 30 August 2019 (Annexure A). The report structure is consistent with the structure specified by the Guide to Traffic Impact Assessment (Transport and Main Roads, December 2018).

Consistent with the Traffic and Transport Impact Assessment (Annexure D) and Public and Passenger Transport Assessment (Annexure G), the study area consists of:

- The development site (refer Figure 1-1 of Annexure G);
- The site's geometric frontage to Sir Leslie Thiess Drive and the Strand; and
- The Strand / Sir Leslie Thiess Drive intersection.

For discussion of wider network impacts and mitigation options refer to Annexure E.

As instructed by TCC on 5 July 2019, all traffic modelling is based on peak hour traffic forecasts produced by TAIM for December 2018 (attached in Appendix E of Annexure G). Acceptance of this instruction does not imply agreement with the TAIM forecasts by Premise. On the contrary Premise has repeatedly expressed concern regarding the realism of these estimates (refer page 5 of Annexure F, Section 5.1 of Annexure G and page 3 of Annexure H). TCC are yet to supply the TAIM calibration report or any other documentation to support the TAIM forecasts despite this information being requested by Premise at the meeting on 5 July 2019. Premise considers the TAIM forecasts to be highly conservative when compared to current traffic estimates based on either:

- 2016 traffic counts; or
- Land use and assumed traffic generation rates.

1.3 Pre-Lodgment Meeting Notes

This report responds to advice provided in the following EDQ documents:

- M1399 – Townsville Marine Tourism Precinct – feedback on scope for DA technical reports email dated 21 December 2018 (refer Appendix A of Annexure D);
- "Information Request and Notification Not Required" letter dated 18 June 2019 (refer Appendix A of Annexure G);
- "Further Issues" letter dated 24 June 2019 (refer Appendix A of Annexure G).
- Revised Submission Requirements issued 9 August 2019 (refer Annexure B); and
- The Amendments to the Service Lane email dated 30 August 2019 (Annexure C).

2 EXISTING CONDITIONS

2.1 Land Use and Zoning

Existing land use and zoning is documented in Section 2.1 of Annexure D.

2.2 Adjacent Land Uses / Approval

Adjacent land uses are documented in Section 2.2 of Annexure D.

Not referenced in Annexure D is the Hive which received Preliminary Approval of the Hive Structure / Precinct Plan on 6 December 2018. As indicated in Section 2.1 of Annexure G, the Hive will not directly impact on study area traffic. Information regarding the Hive approval and the wider road network implications are documented on pages 4 to 6 of Annexure E.

2.3 Surrounding Road Network Details

The existing condition of the study area road network is documented in Section 2.3 of Annexure D.

The existing condition of the wider road network is documented on pages 1 and 2 of Annexure E.

2.4 Traffic Volumes

In Section 2.4 of Annexure D, 2019 'without development' traffic was estimated based on land use and assumed traffic generation rates. As the land use catchment is closed, through traffic is excluded from the study area and traffic forecasting based on land use is an acceptable alternative to traffic forecasting based on traffic counts.

Traffic counts for Sir Leslie Thiess Drive and SeaLink (formerly Sunferries) car park taken in April 2016 provided by TCC are attached in Appendix B of Annexure G and discussed in Section 2.2 of Annexure G. In accordance with the Guide to Traffic Impact Assessment: Frequently Asked Questions (December 2017), 2016 traffic count data is considered a reasonable estimate of current (2019) peak hour traffic.

Section 5.1 of Annexure G compares estimates of current traffic based on the above two (2) sources and TAIM. It is concluded that the TAIM forecasts are highly conservative when compared to current traffic estimates based on either 2016 traffic counts or land use and assumed traffic generation rates. Despite this, in accordance with TCC instructions, all traffic modelling is based on peak hour traffic forecasts produced by TAIM for December 2018 as indicated in Section 0.

2.5 Intersection and Network Performance

The only existing intersection on the study area road network is the Strand / Sir Leslie Thiess Drive Intersection as described in Section 2.3.3 of Annexure D.

Only 2019 'without development' traffic estimated based on land use and assumed traffic generation rates as shown by Figures 2-6 and 2-7 of Annexure D provides enough detail for assessment of existing intersection performance. SIDRA analysis of the Strand / Sir Leslie Thiess Drive intersection based on these traffic estimates is summarised in Section 2.5.1 of Annexure D with SIDRA output reports attached in Appendix B of Annexure D. Key outputs from the SIDRA model were:

- The intersection is operating well below practical capacity;
- The maximum average delay to any movement is considered very short; and
- Maximum queue lengths do not exceed one (1) vehicle.

2.6 Site Access

Existing site access is documented in Section 2.6 of Annexure D.

2.7 Public Transport

Existing public transport in the study area is documented in Section 2.7 of Annexure D.

2.8 Active Transport

Existing active transport in the study area is documented in Section 2.8 of Annexure D.

3 PROPOSED DEVELOPMENT DETAILS

3.1 Development Site Plan

This report is based on the architectural plans dated 30 August 2019 by Bureau Proberts / Counterpoint which are attached in Annexure A. The development consists of:

- Ferry terminal and bus hub including waiting areas, ferry operator offices and workshop;
- 82-room hotel with 306m² restaurant / bar;
- 625m² of commercial across two (2) tenancies;
- 570m² of retail across four (4) tenancies; and
- 463-space multi-level car park plus coach / bus, drop-off / pick-up and taxi zones.

This is a lower development yield than assumed in previous documents (refer Section 3.1 of Annexure D, page 2 of Annexure E, Section 3.1 of Annexure G).

3.2 Operational Details

Proposed operational details are documented in Section 3.2 of Annexure G.

3.3 Proposed Access and Parking

The proposed access and parking arrangement has the following features:

- A new indented bus bay on the eastern side of Sir Leslie Thiess Drive on the site frontage including:
 - o A premium bus stop with capacity for two (2) 14.5m-long coaches / tourist buses; and
 - o A commercial loading zone / shuttle bus drop-off / pick-up with capacity for two (2) 8.8m long medium rigid vehicles;
- A new taxi rank with capacity for four (4) taxis on the northern side of the Strand on the site frontage. The taxi space at the start of the rank will be accessible by people with disabilities in accordance with the Amendments to the Service Lane email (Annexure C);
- A new access road on the northern site frontage to access:
 - o The hotel's porte-cochere including three (3) drop-off / pick-up bays;
 - o Eight (8) recreational vehicle (RV) parking bays; and
 - o A crane / service vehicle bay supporting ferry operations;
- A new left-in-left-out-right-in intersection with the new access road on Sir Leslie Thiess Drive;
- Removal of one (1) northbound lane on Sir Leslie Thiess Drive on the site frontage to accommodate a coach / bus layover zone with capacity for three (3) 12.5m long buses on the western side of Sir Leslie Thiess Drive and an exclusive right turn lane at the access road intersection;
- Relocation of the existing median refuge on Sir Leslie Thiess Drive north of the new intersection;
- A service lane internal to the site on the Sir Leslie Thiess Drive frontage operating one-way from the access road at the northern end of the site to a left-out only exit onto Sir Leslie Thiess Drive near the Strand. The service lane is consistent with feedback / comments in the Amendments to the Service Lane email (Annexure C) and incorporates (from north to south):
 - o 13 parallel parking bays for passenger drop-off / pick-up;
 - o Left-in-left-out access to hotel and ferry terminal service / loading areas;
 - o Left-in-left-out access to the 463-space multi-level car park including motorbike parking and ferry terminal freight drop;
 - o A premium bus stop with capacity for two (2) 12.5m-long local / school buses;
 - o A pedestrian crossing; and
 - o A general drop-off / pick-up bay for people with disabilities (PWD);
- A new median refuge on Sir Leslie Thiess Drive between the service lane exit and the coach / bus layover bays;
- A waterfront promenade internal to the site on the Ross Creek frontage with a minimum width of 4m providing connectivity between a waterfront plaza at the eastern end of the Strand at the southern end of the site and the relocated Sir Leslie Thiess Drive at the northern end of the site;
- Bicycle end-of-trip facilities for staff are provided centrally and shared by all tenancies.

The access and parking arrangement is most like the scenario modelled in Annexures G and H except in relation to RV parking which has been:

- Relocation from the hotel and ferry terminal service / loading area accessed via the service lane to the northern side of the access road opposite the hotel porte-cochere; and
- Increased from six (6) bays to eight (8) bays.

4 DEVELOPMENT TRAFFIC

4.1 Traffic Generation

In Section 4.1 of Annexure D, the peak hour bus and light vehicle traffic generation was estimated for a higher development yield scenario (refer Section 3.1). Traffic generation was estimated using traffic generation rates obtained from the “Breakwater and Associated Developments: Assessment of Peak Hour Traffic Volumes” (TCC Breakwater Report) dated 11 December 2007 by C & G Horman Pty Ltd for TCC.

EDQ’s “Information Request” letter dated 18 June 2019 (refer Appendix A of Annexure G):

- Requested revision of the Traffic and Transport Impact Assessment (Annexure D) based on recent trip generation rate information; and
- Noted that the TCC Breakwater Report is more than 10 years old.

Pages 3 and 4 of Annexure F summarises a literature review regarding traffic generation rates. On page 6 of Annexure F Premise:

- Strongly refutes the implication of the Information Request that more recent trip generation rate information is available for the proposed development;
- Affirms that the trip generation rate information contained in the TCC Breakwater Report is the best available data.

As indicated in Section 4.1.6 of Annexure D, the Traffic and Transport Impact Assessment assumed that light vehicle traffic generation rates included trips by private car, taxi and ride share, e.g. Uber. As indicated in Section 4.1.2 of Annexure G, this assumption was altered in the Public Passenger Transport Assessment such that the light vehicle traffic generation estimated in the Traffic and Transport Impact Assessment (Annexure D) included only trips by private car and ride share with taxi trips resulting in additional light vehicle trips. Section 4.1 of Annexure G goes on to estimate:

- External people trips by:
 - o Private vehicle (including ride share);
 - o Taxi;
 - o Bicycle;
 - o Pedestrians;
 - o Long distance coach or tourist bus;
 - o Local bus; and
 - o School bus; and
- Vehicle trips (in addition to bus and private vehicle / ride share trips) by:
 - o Taxis; and
 - o Vans (RVs).

Despite the lower development yield (refer Section 3.1), the development traffic generation estimated in Section 4.1 of Annexure G is adopted as a conservative estimate of traffic generated by the development proposal shown by architectural plans attached in Annexure A.

Premise acknowledge that, based on Section 4.1.5 of Annexure G, the increase in RV parking from six (6) bays to eight (8) bays would generate one (1) additional RV trip per hour during peak periods. However, with relocation of RV parking to the access road opposite hotel porte-cochere (refer Section 0) and the 17 room reduction in hotel size (c.f. Section 3.1 of Annexure G and Section 3.1), Premise

still considers the development traffic generation estimated in Section 4.1 of Annexure G conservative.

4.2 Trip Distribution

The assumed trip distribution is documented in Section 4.2 of Annexure G.

4.3 Development Traffic Volumes on the Network

In accordance with EDQ's revised submission requirements (refer Annexure B), a graphic presentation of development traffic volumes on the network (including pedestrians and bicycles) is attached in Annexure J with the ground level architectural plan from Annexure A as a background.

5 IMPACT ASSESSMENT AND MITIGATION

5.1 With and Without Development Traffic Volumes

As instructed by TCC on 5 July 2019, peak hour traffic forecasts produced by TAIM for December 2018 (attached in Appendix E of Annexure G) have been adopted as 'without development' traffic volumes.

'With development' traffic volumes attached in Annexure K are the sum of 'without development' traffic volumes (refer Appendix E of Annexure G) and development traffic volumes on the network (refer Annexure J).

5.2 Road Safety Impact Assessment and Mitigation

A Road Environment Safety Assessment was conducted in accordance with the Guide to Traffic Impact Assessment (Transport and Main Roads, December 2018) to determine if the proposed roadworks should be subjected to either:

- A road safety audit by an accredited road safety auditor; or
- A road safety assessment by either an accredited road safety auditor or a registered professional engineer of Queensland (RPEQ).

The assessment was conducted using the road environment safety rating matrix from the Guide to Traffic Impact Assessment reproduced below as Table 5-1.

Table 5-1: Road Environment Safety Rating Matrix (Transport and Main Roads)

Traffic volume (AADT)	Speed (km/h)		
	Up to 50km/h	60km/h to 70km/h	80km/h+
≤8,000	Low	Medium	Medium
>8,000	Medium	Medium	High

The posted speed limit in the study area is 50km/h.

Assuming that peak hour traffic volumes are 10% of the daily traffic volumes, the 8,000vpd traffic volume threshold becomes 800vph. Based on the 'with development' traffic volumes attached in Annexure J the 800vph threshold is only exceeded at the Strand / Sir Leslie Thiess Drive intersection. Therefore, the level of risk is medium at the Strand / Sir Leslie Thiess Drive and low everywhere else within the study area.

For development within a priority development area (refer Section 2.1 of Annexure D):

- A road safety audit by an accredited road safety auditor is required for any road environment changes in areas with a medium or high level of risk; but
- A road safety assessment by either an accredited road safety auditor or a RPEQ is acceptable for road environment changes in areas with a low risk level.

No changes are proposed to the Strand / Sir Leslie Thiess Drive intersection; therefore it does not require a road safety audit (or assessment).

All proposed road environment changes are in areas with a low risk level and therefore do not require a road safety audit but should be subject to a road safety assessment at the detailed design stage. The road safety assessment may be conducted by either an accredited road safety auditor or a RPEQ

The above conclusions are consistent with Section 5.2 of Annexure D.

5.3 Access and Frontage Impact Assessment and Mitigation

5.3.1 Turn Warrant Assessment

A turn warrant assessment was conducted for the proposed Sir Leslie Thiess Drive / access road intersection based on warrants contained in the Supplement to Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (Transport and Main Roads, August 2014). The assessment assumed a design speed of 60km/h being 10km/h above the posted speed limit and therefore adopted the Supplement's warrant diagram reproduced as Figure 5-5 of Annexure D.

'With development' traffic volumes at the Sir Leslie Thiess Drive / access road intersection (refer Annexure K) show that:

- During the morning peak hour, the right turn volume, Q_R , is 295vph and the major road volume, Q_M , is 417vph; and
- During the evening peak hour, the right turn volume, Q_R , is 193vph and the major road volume, Q_M , is 444vph

Both morning and evening peak hour traffic warrant a channelised right turn treatment (CHR) on Sir Leslie Thiess Drive at the access road intersection. This conclusion is consistent with page 4 of Annexure H. Further detail regarding the warranted CHR turn treatment can be found on page 4 of Annexure H.

5.3.2 Intersection Analysis

SIDRA analysis was undertaken for the following sites:

1. Sir Leslie Thiess Drive / access road intersection;
2. Service lane entry from the access road;
3. Car park access on the service lane;
4. Pedestrian crossing (zebra) on the service lane;
5. Service lane exit to Sir Leslie Thiess Drive; and
6. The Strand / Sir Leslie Thiess Drive intersection.

SIDRA outputs are attached as Annexure L and indicate:

- All intersections and accesses are operating well below their practical capacity, i.e. degrees of saturation are much less than 0.80;
- Delays are very short, i.e. all lanes movements are operating at level of service A; and
- The maximum queue length in any lane at any intersections or access is two (2) vehicles, i.e. 95th percentile back of queue lengths are all less than 2.0.

These results are consistent with page 5 and Attachment D of Annexure H.

5.3.3 Intersection Layout

In accordance with EDQ's Revised Submission Requirements (Annexure B), swept path analysis for all relevant vehicle types is attached as Annexure M and discussed below.

5.3.3.1 Bus

In accordance with the Amendments to the Service Lane email (Annexure C), swept path analysis for a 12.5m long bus using the local / school bus stop on the service lane is shown by HON-0031-SKC018-REV1 attached in Annexure M. The bus:

- Turns right into the access road from the exclusive right turn lane on Sir Leslie Thiess Drive;
- Continues right into the service;
- Enters the bus stop without encroaching on any parking bays within the service lane;
- Stops within the designated bay adjacent to the premium bus stop;
- Exits the bus stop without encroaching on any parking bays within the service lane; and
- Turns left out of the service lane into the kerbside lane of Sir Leslie Thiess Drive.

Kerb extensions should not be provided at the pedestrian crossing on the service lane as these could restrict the movement of buses exiting the local / school bus stop.

5.3.3.2 Crane

SeaLink advise that cranes will be required to access the crane / service vehicle bay at the western end of the access road three (3) or four (4) times per year to load / unload heavy items, e.g. engines, to / from ferries. Swept path analysis for a crane has been conducted based on a 12.5m-long heavy rigid vehicle and is shown by HON-0031-SKC019-REV1 attached in Annexure M. The crane:

- Turns right into the access road from the exclusive right turn lane on Sir Leslie Thiess Drive;
- Drive over part of the public plaza and reverses into the marked crane / service vehicle bay;
- Exits directly from the crane / service vehicle lane through the porte-cochere; and
- Turns left out of the access road into the median-side lane of Sir Leslie Thiess Drive.

As cranes will not be accessing the crane / service vehicle bay every week it is considered acceptable for cranes to driver over part of the public plaza and turn into the median-side lane of Sir Leslie Thiess Drive.

To facilitate crane access to the crane / service vehicle bay the public plaza at the eastern end of the access road will need to be load bearing with flush kerbs. Removable bollards will be required to protect users of the public plaza when cranes are not accessing the crane / service vehicle bay.

5.3.3.3 Refuse Collection Vehicle

The largest vehicle expected to access the hotel and ferry terminal service / loading areas is a refuse collection vehicle. Swept path analysis for a refuse collection vehicle has been conducted based on 10.3m-long vehicle and is shown by HON-0031-SKC019-REV1 attached in Annexure M: The refuse collection vehicle:

- Turns left from the service lane into the service / loading area without encroaching on any parking bays within the service lane;
- Can turn around with a single reversing manoeuvre; and
- Turns left out of the service / loading area into the service lane without encroaching on any parking bays within the service lane.

Detailed design of the cross over between the service lane and the service / loading area will need to consider the wheel path of refuse collection vehicles.

The refuse collection vehicle encroaches on the multi-level car park entry lane when making the reversing manoeuvre associated with turning around in the service / loading area.

5.3.3.4 Recreational Vehicle

Eight (8) 60° nose-in angle parking bays are provided for RVs on the northern side of the access road opposite the hotel porte-cochere. The angle parking arrangement provides easy entry.

Swept path analysis for an RV exiting an RV parking bay has been conducted based on an 8.8m long medium rigid vehicle and is shown by HON-0031-SKC020-REV1 attached in Annexure M. The RV:

- Reverses out of the RV parking bay into the eastbound lane of the access road;
- Circulates right through the porte-cochere; and
- Turns left out of the access road into the kerbside lane of Sir Leslie Thiess Drive.

5.3.3.5 Car

The largest vehicle expected to access the multi-level car park is a B99 car. Swept path analysis for a B99 car is shown in Annexure M by:

- HON-0031-SKC020-REV1 for the ground level; and
- HON-0031-SKC021-REV1 for the mezzanine level.

The car enters the multi-level car park by:

- Turning left from the service lane into the multi-level car park without encroaching on any parking bays within the service lane; and
- Continues up the ramp to the entry gate located at the mezzanine level;

The car exits the multi-level car park by:

- Passing through one (1) of the two (2) exit gates on the mezzanine level; and
- Turns left out of the multi-level car park into the service lane without encroaching on any parking bays within the service lane.

To manage the merge downstream of the two (2) exit gates (refer HON-0031-SKC021-REV1 in Annexure M), the exit gates will need to be linked such that only one (1) gate is open at a time.

5.3.4 Sight Distances

Sight distance requirements are documented in Section 5.3.3. of Annexure D.

As indicated in Section 5.3.3. of Annexure D, sight distances at the Sir Leslie Thiess Drive / access road intersection comply with approach sight distance (ASD) and minimum gap sight distance (MGSD) which is acceptable for an access or public road intersection.

As indicated on page 4 of Annexure H, sight distances at the service lane exit to Sir Leslie Thiess Drive comply with ASD and safe intersection sight distance (SISD) which is desirable for an access or public road intersection.

5.4 Intersection Delay Impact Assessment and Mitigation

As states in Section 5.3.2, SIDRA outputs attached as Annexure L indicate:

- All intersections and accesses operating well below their practical capacity, i.e. degrees of saturation are much less than 0.80;
- Delays are very short, i.e. all lanes movements are operating at level of service A; and
- The maximum queue length in any lane at any intersections or access is two (2) vehicles, i.e. 95th percentile back of queue lengths are all less than 2.0.

These results are consistent with page 5 and Attachment D of Annexure H.

5.5 Other Impacts Assessment Relevant to the Specific Development Type / Location

5.5.1 Public Transport

5.5.1.1 Bus Stop Infrastructure

In accordance with the Amendments to the Service Lane email (Annexure C), the architectural plans attached in Annexure A show the proposed dimensions for bus stop infrastructure. These dimensions comply with the Public Transport Infrastructure Manual (Department of Transport and Main Roads, March 2016) as follows:

- Allowance for a 12.8m long and 4.2m deep premium bus stop at both the local / school bus stop on the service lane and the coach / tourist bus stop on Sir Leslie Thiess Drive;
- The local / school bus stop on the service lane complies with the Manual's requirements for an on-road stop as described in Section 5.2 of Annexure G;
- The coach / tourist bus stop on Sir Leslie Thiess Drive complies with the Manual's requirements for an indented stop as described in Section 5.2 of Annexure G;
- Layover bays on the western side of Sir Leslie Thiess Drive comply with the Manual's requirements for an on-road stop with capacity for three (3) 12.5m long buses parked nose-to-tail or two (2) 14.5m long coaches operating independently.

The Amendments to the Service Lane email (Annexure C) comments that private vehicles on the service lane will conflict with buses using the local / school bus. Premise considers location of the local / school bus on the service lane a positive outcome on the basis that:

- Safety is improved by location of the bus stop in the low speed environment of the service lane;
- Desire lines for movement between the bus stop and the ferry terminal, including the movement of students associated with school buses, do not conflict with any vehicle paths;
- Relocation of the bus stop off Sir Leslie Thiess Drive reduces conflict with through traffic; and
- The bus stop is accessible directly from the northbound carriageway of Sir Leslie Thiess Drive which minimises diversions, circuitous routes, backtracking and dead running.

5.5.1.2 Taxi Infrastructure

Taxi infrastructure is consistent with that documented in Section 5.3 of Annexure G.

The taxi space at the start of the rank will be accessible by people with disabilities in accordance with the Amendments to the Service Lane email (Annexure C).

5.5.2 Pedestrian Crossing / Refuge Locations

Pedestrian and bicycle desire lines are shown in Annexure J. The desire lines indicate conflicts between motorised and active transport modes in the following locations:

- Sir Leslie Thiess Drive north of the access road (northern crossing);
- Sir Leslie Thiess Drive between the service lane exit and bus / coach layover bays (southern crossing);
- South of the local / school bus stop on the service lane (service lane crossing); and
- Across the hotel and ferry terminal service / loading areas and multi-level car park accesses on the service lane (access crossing).

5.5.2.1 Sir Leslie Thiess Drive Northern Crossing

With the latest architectural plans (Annexure A), pedestrian and bicycle volumes using the northern crossing of Sir Leslie Thiess Drive are less than was estimated in the Public Passenger Transport Assessment (Annexure G), particularly during the morning peak hour. Notwithstanding this, the discussion contained in Section 5.4.1 of Annexure G and the Australasian Pedestrian Crossing Facility Selection Tool (APCFST) assessment contained in Appendix G of Annexure G are still considered valid. Therefore, it is recommended that the median refuge on Sir Leslie Thiess Drive is reinstated during construction of the access road intersection and the northbound carriageway of Sir Leslie Thiess Drive is reduced from two (2) lanes to one (1) lane.

5.5.2.2 Sir Leslie Thiess Drive Southern Crossing

Relative to the southern crossing of Sir Leslie Thiess Drive assessed in Section 5.4.2 and Appendix H of Annexure G, relocation of the crossing from the Strand to between the service lane exit and the bus / coach layover bays:

- Increases pedestrian and bicycle volumes using the crossing;
- Avoids the conflict with vehicles exiting the service lane; and
- Relocates the crossing from an intersection to a mid-block location.

The APCFST assessment was updated to reflect these changes and is attached as Annexure N. The updated APCFST assessment confirms the conclusion in Section 5.4.2 of Annexure G that, as construction of a median refuge will be the lowest cost option (other than no facility), it is expected that the benefit cost ratio (BCR) will be greatest for this option.

5.5.2.3 Service Lane Crossing

Based on the APCFST assessment in Appendix I of Annexure G, Section 5.4.3 of Annexure G recommends that the service lane crossing is constructed as a zebra with platform and kerb extensions with the service lane speed limit restricted to 20km/h. Swept path analysis for a 12.5m long bus using the local / school bus stop on the service lane (refer HON-0031-SIC018-REV1 in Annexure M) indicates that kerb extensions at the service lane crossing could restrict buses exiting the local / school bus stop. Considering this the APCFST assessment was revised adopting zebra with platform as the existing facility.

The best option in all criteria was grade separation, however, this would not align with the desire line for crossing of the service lane at grade.

The next best option in terms of perceived safety and pedestrian level of service is signals, however, this is the highest cost option, particularly in terms of vehicle and pedestrian delays. High pedestrian delay costs are likely to lead to pedestrians ignoring the crossing.

After grade separation, the best option in terms of total benefits is to provide no facility. This suggests that it is acceptable for pedestrians to cross the service lane at any point. However, this option has the worst perceived safety, pedestrian level of service and crash costs. It is recommended that some form of crossing facility is provided to concentrate pedestrian movements and improve safety for sensitive pedestrians.

After no facility the best option in terms of total benefits is a platform. The platform has similar perceived safety and pedestrian level of service to no facility but reduces crash costs with an increase in vehicle delay. Perceived safety, pedestrian level of service, and crash costs can be improved by combining a zebra with the platform; however, the safety savings are outweighed by increased delay costs.

Where platforms are provided as pedestrian crossing facilities without a zebra, there can be confusion between pedestrians and drivers regarding who has priority. Therefore, it is recommended that the service lane crossing is constructed as a zebra with platform to:

- Align with community expectations for a pedestrian crossing on the service lane;
- Concentrate pedestrian movements across the service lane; and
- Improve safety, particularly for sensitive pedestrians.

5.5.2.4 Access Crossing

Pedestrians moving within the development will need to cross the access to the hotel and ferry terminal service / loading areas and multi-level car park when travelling between:

- Passenger drop-off / pick-up bays on the eastern side of the service lane and the ferry terminal; and
- The hotel and bus stops.

As this is a totally new facility, crash information was assessed using the APCFST model and not crash history.

The critical peak for the crossing will be the evening peak hour with 50 pedestrians expected to use the crossing and 207 cars expected to enter or exit the multi-level car park.

The APCFST assessment for the access crossing is attached in Annexure P. The base case was assumed to be 'no facility'.

To not provide a facility at this location would be unacceptable as it would be perceived as resulting in very poor safety, provide a very poor pedestrian level of service and results in the highest costs of the assessed options.

The location of this crossing at an intersection and its width make it unsuitable for a platform, zebra or grade separated facility.

The best option in terms of total benefits and perceived delay is kerb extensions with median refuge. However, geometric requirements for access to the hotel and ferry terminal service / loading areas and multi-level car park will likely prohibit provision of kerb extensions.

A median refuge without kerb extensions performs only slightly worse in total benefits and has the same perceived delay as a median refuge with kerb extensions. Perceived safety is slightly lower without kerb extensions, but actual crash costs are expected to be the same.

In the context of the hotel and ferry terminal service / loading areas and multi-level car park access the provision of one (1) or more median refuges is considered a highly practical option with refuges provided in association with building columns at little or no cost without restricting vehicle movements.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary of Impacts and Mitigation Measures

6.1.1 Road Safety

In accordance with the Guide to Traffic Impact Assessment (Transport and Main Roads, December 2018), the proposed roadworks do not require a road safety audit but should be subject to a road safety assessment. The road safety assessment may be conducted by either an accredited road safety auditor or a RPEQ.

6.1.2 Access and Frontage

6.1.2.1 Turn Warrant Assessment

In accordance with the Supplement to Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (Transport and Main Roads, August 2014) it is recommended that a 55m long right turn lane (including taper) is provided on Sire Leslie Thiess Drive for traffic entering the access road.

6.1.2.2 Intersection Analysis

SIDRA analysis indicates all accesses and internal intersections operating well below their practical capacity with very short delays and the maximum queue length in any lane being two (2) vehicles.

6.1.2.3 Intersection Layout

Swept path analysis indicates that all relevant vehicles can access and manoeuvre through the site subject to:

- No kerb extensions at the pedestrian crossing on the service lane as these could restrict the movement of buses exiting the local / school bus stop;
- The public plaza at the eastern end of the access road being load bearing with flush kerbs to facilitate crane access to the crane / service vehicle bay. Removable bollards will be required to protect users of the public plaza when cranes are not accessing the crane / service vehicle bay;
- Consideration of the wheel path of refuse collection vehicles in detailed design of the crossover between the service land and the hotel and ferry terminal service / loading area.
- Detailed design of the cross over between the service lane and the service / loading area will need to consider the wheel path of refuse collection vehicles;
- The refuse collection vehicle encroaching on the multi-level car park entry lane when making the reversing manoeuvre associated with turning around in the hotel and ferry terminal service / loading area;
- RV parking being 60° nose-in angle parking bays to provide easy entry; and
- Linking of the two (2) exit gates from the multi-level car park such that only one (1) gate is open at a time to manage the merge downstream of the exit gates.

6.1.2.4 Sight Distances

In accordance with the Guide to Traffic Impact Assessment (Transport and Main Roads, December 2018) sight distances at the Sir Leslie Thiess Drive / access road intersection and the service lane exit to Sir Leslie Thiess Drive are acceptable.

6.1.3 Intersection Delay

SIDRA analysis indicates all internal and external intersections operating well below their practical capacity with very short delays and the maximum queue length in any lane being two (2) vehicles.

6.1.4 Other

6.1.4.1 Public Transport

Bus stop and taxi infrastructure complies with the Public Transport Infrastructure Manual (Department of Transport and Main Roads, March 2016) and EDQ's Amendments to the Service Lane email dated 30 August 2019 (Annexure C).

6.1.4.2 Pedestrian Crossing / Refuge Locations

Australasian Pedestrian Crossing Facility Selection Tool Assessment indicates:

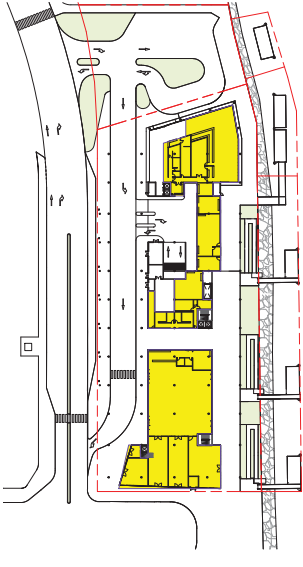
- When the access road intersection is constructed the exiting median refuge on Sir Leslie Thiess Drive should be relocated to the northern side of the intersection and the northbound carriageway of Sir Leslie Thiess Drive reduced from two (2) lanes to one (1) lane;
- A median refuge should be provided on Sir Leslie Thiess Drive between the service lane exit and the bus / coach layover bays to support the desire line for movements between ferry terminal (and commercial / retail tenancies) and the Kings Street Quarter (and Strand shared path);
- A zebra with platform should be provided on the Service Lane south of the local / school bus stop to support the desire line for movements between the ferry terminal and passenger drop-off / pick-up bays on the concourse; and
- One (1) or more median refuges should be incorporated into the hotel and ferry terminal service / loading areas and multi-level car park access to support the desire line for movements along the service lane between the ferry terminal and passenger drop-off / pick-up bays.

6.2 Certification Statement and Authorisation

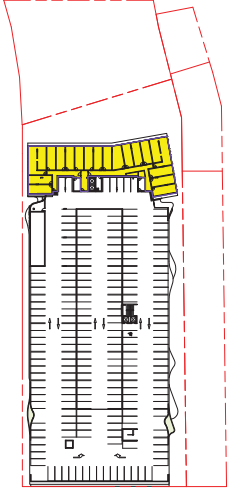
This report was prepared by Mr Bradley Jones (RPEQ 19986).

Traffic Impact Assessment Certification in accordance with the Guide to Traffic Impact Assessment (Transport and Main Roads, December 2018) is attached in Annexure Q.

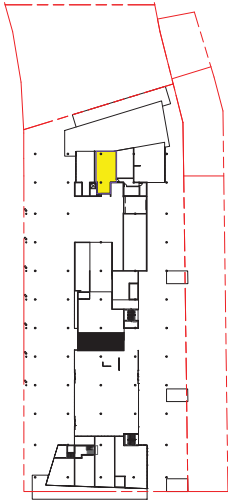
ANNEXURE A
ARCHTECTURAL PLANS (30 AUGUST 2019)



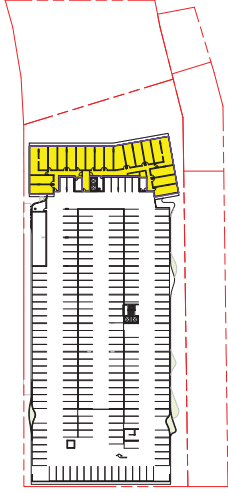
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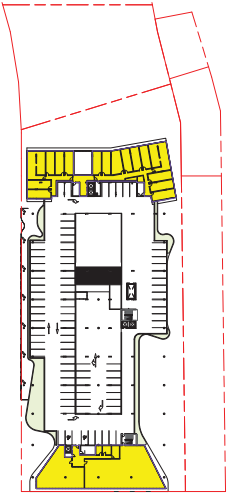
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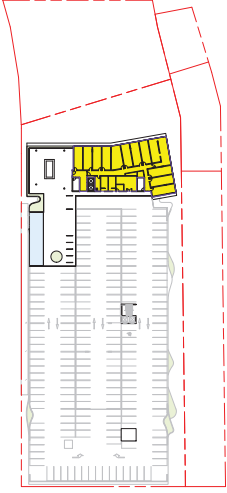
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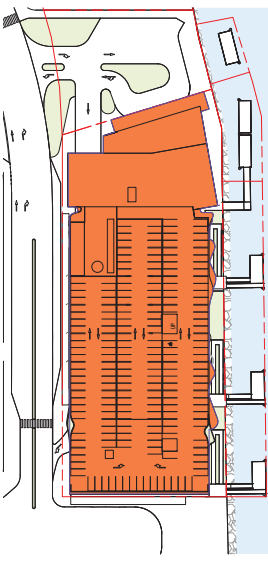
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⑤ LEVEL 1 GFA
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⑥ LEVEL 5 GFA
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⑦ SITE COVER
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GFA	
Ground Level	2660.5 m ²
Ground Level Mezzanine	109.7 m ²
Level 1	1391.5 m ²
Level 2	1357.0 m ²
Level 3	815.8 m ²
Level 4	815.8 m ²
Level 5	635.9 m ²
TOTAL GFA	7786.2 m ²

DEVELOPMENT SUMMARY

Site Area: 8719m² (Land Lease)
2696m² (Water Lease)
2142m² (POTL Road Access)

Height: 3 Storey Commercial / Retail
3 Storey Carpark
6 Storey Hotel

Site cover: 7409 m²

Rooms: 82
Parking: 463 + coaches / buses,
drop-off & taxi zones

Address: Sir Leslie Thiess Drive

Use: Short term accommodation (Hotel)
Commercial premises
Carpark

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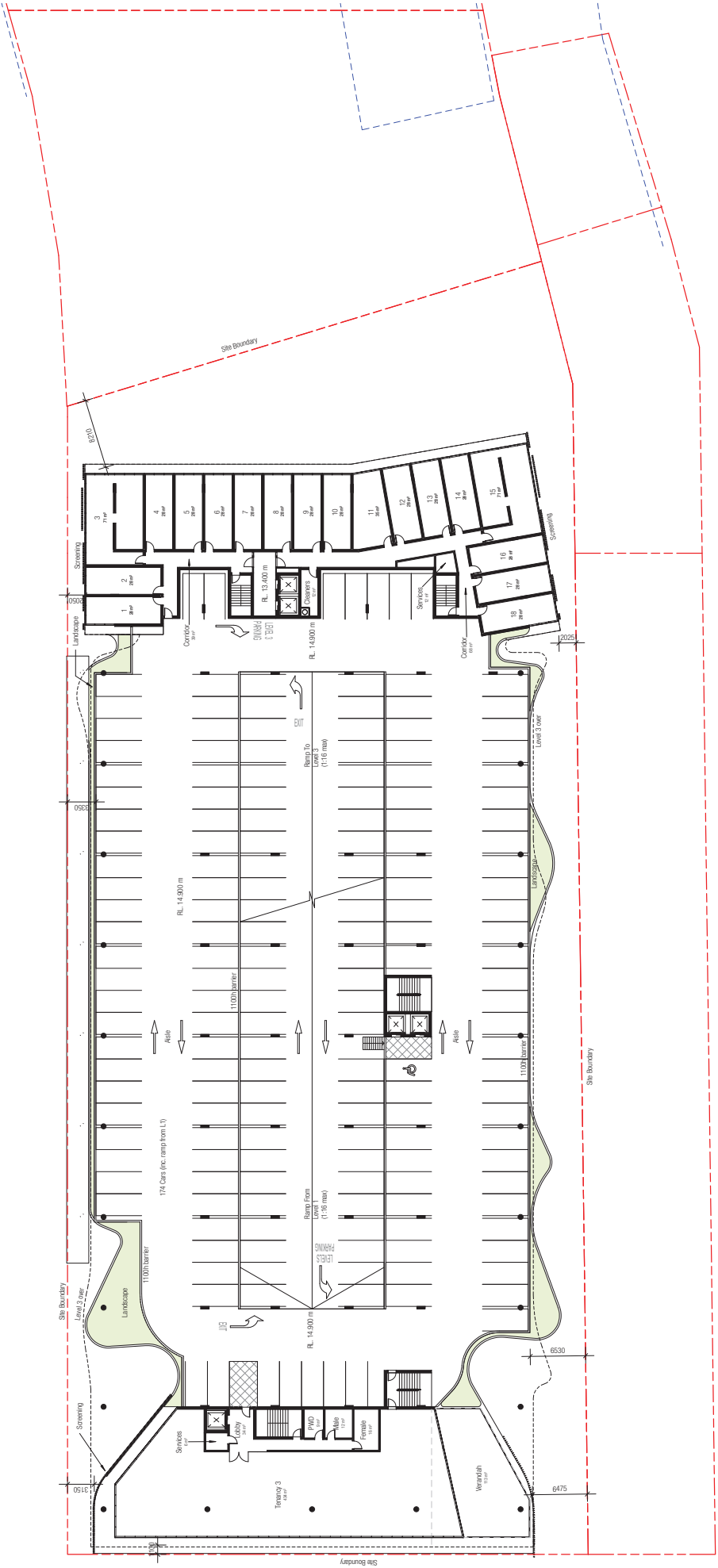
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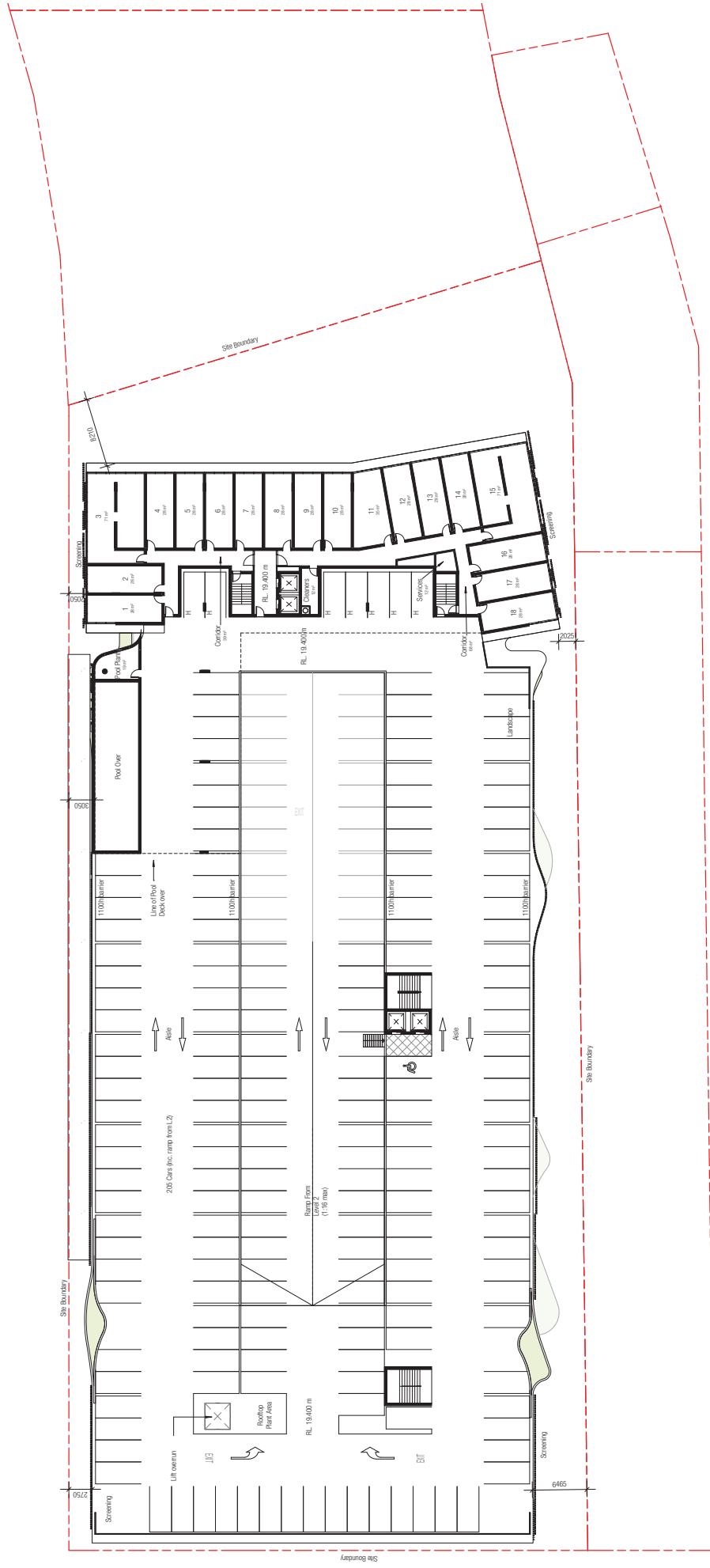
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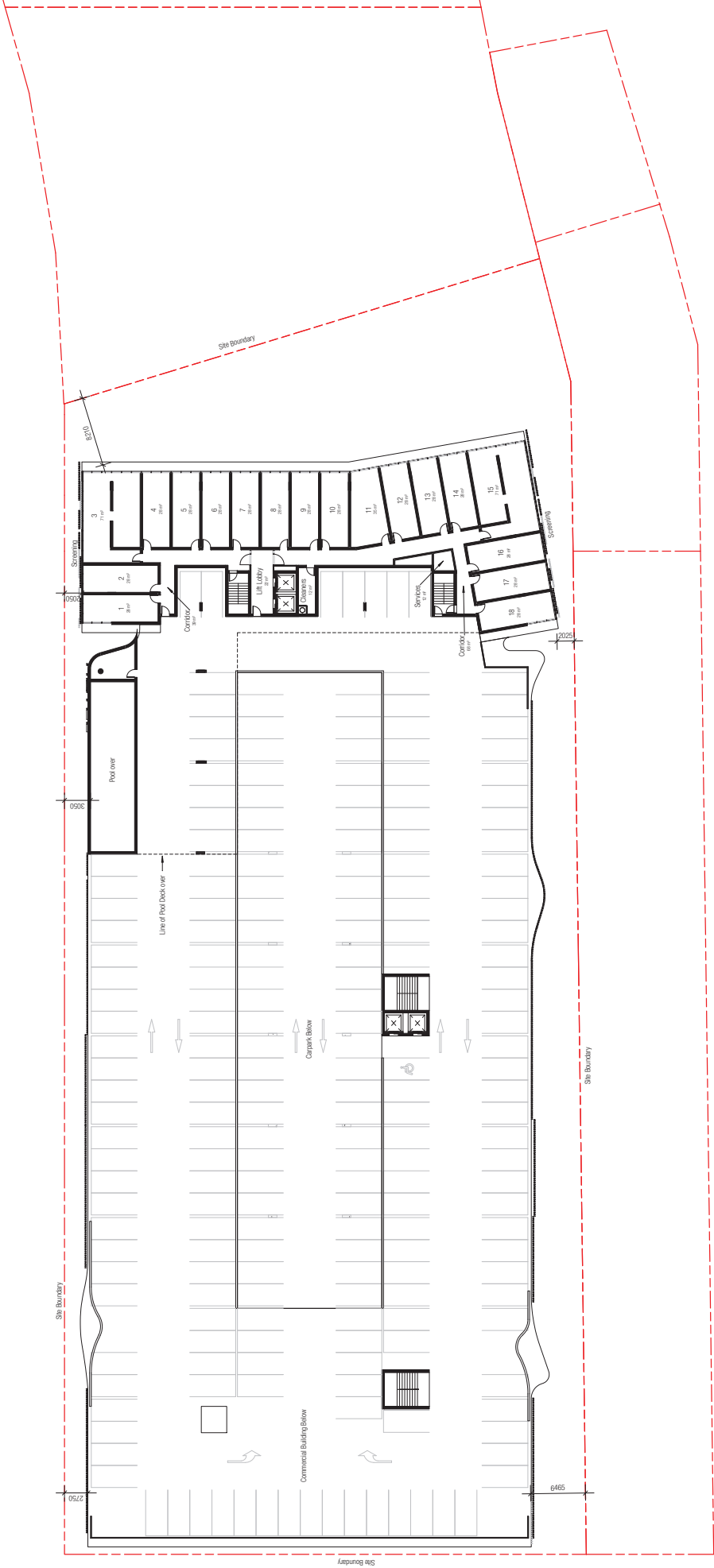
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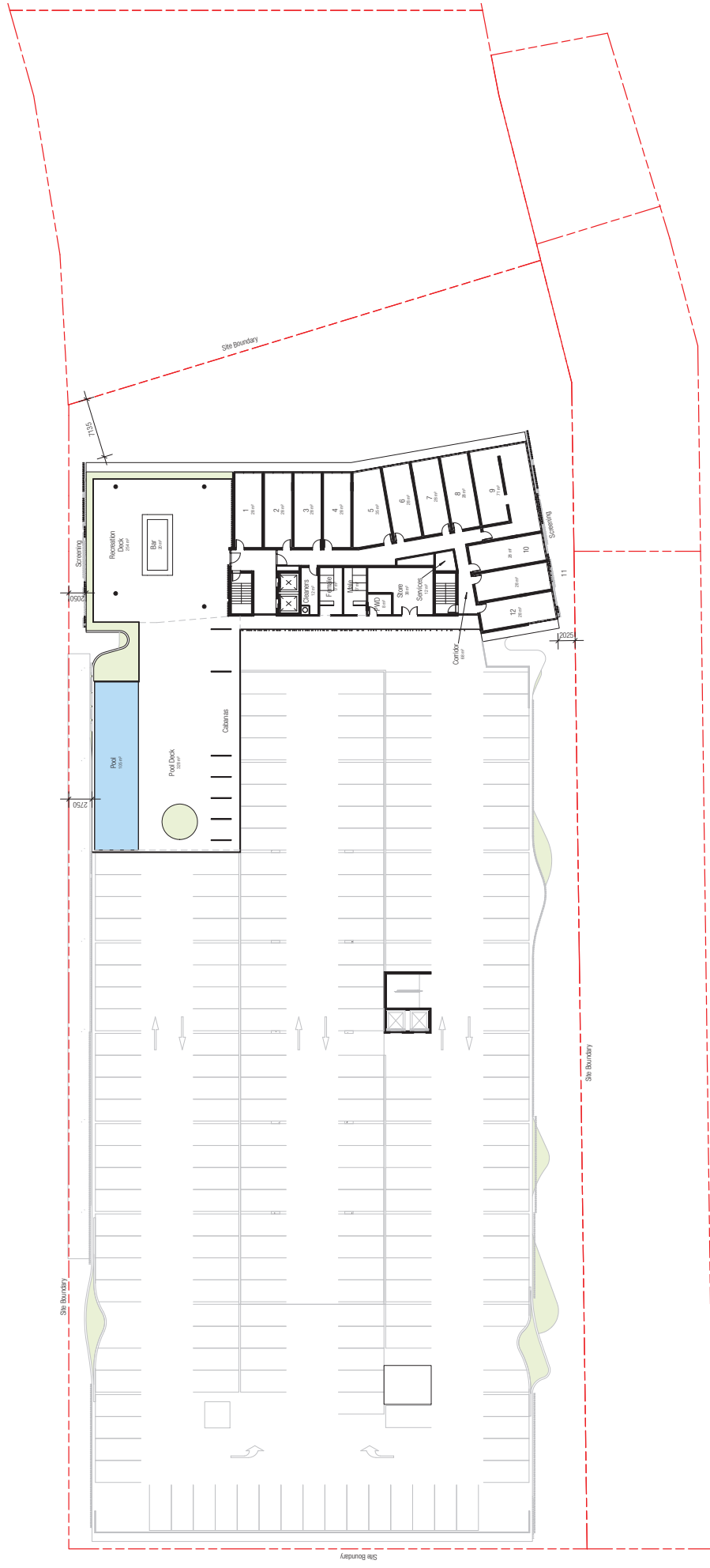


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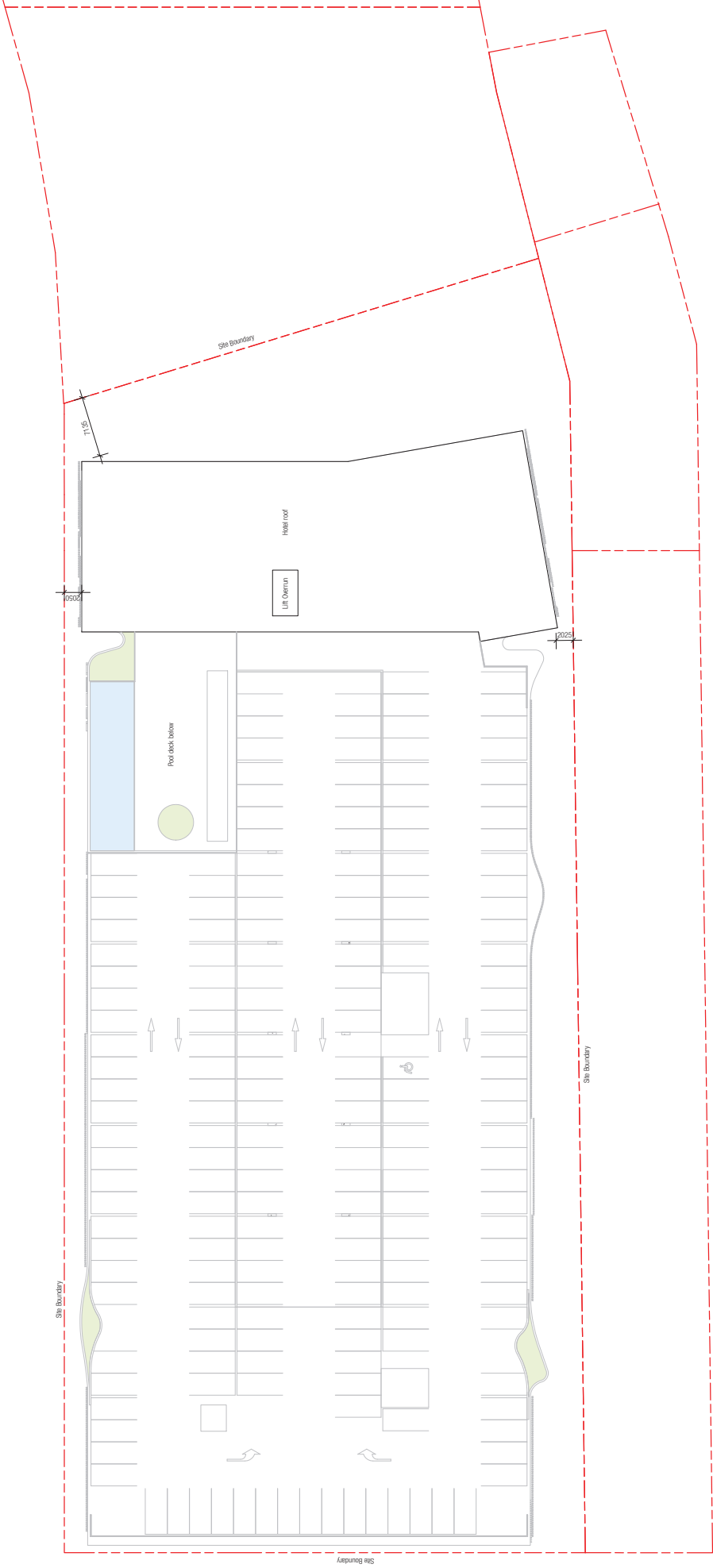
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DA	DA206

DATE:	30.08.19
REVISION:	4

DA ISSUE



① DA 07 LEVEL 7 ROOF
SCALE: 1:250

GENERAL NOTES:
1. THIS DRAWING IS A PART OF THE DEVELOPMENT APPLICATION FOR THE
2. THE DEVELOPER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY APPROVALS FROM THE LOCAL GOVERNMENT.
3. THE DEVELOPER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY APPROVALS FROM THE LOCAL GOVERNMENT.
4. THE DEVELOPER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY APPROVALS FROM THE LOCAL GOVERNMENT.

REV	DESCRIPTION	DATE
1	ISSUED FOR TENDERS	28.08.19
2	REVISED FOR DA	28.08.19
3	REVISED FOR DA	28.08.19
4	REVISED FOR DA	28.08.19



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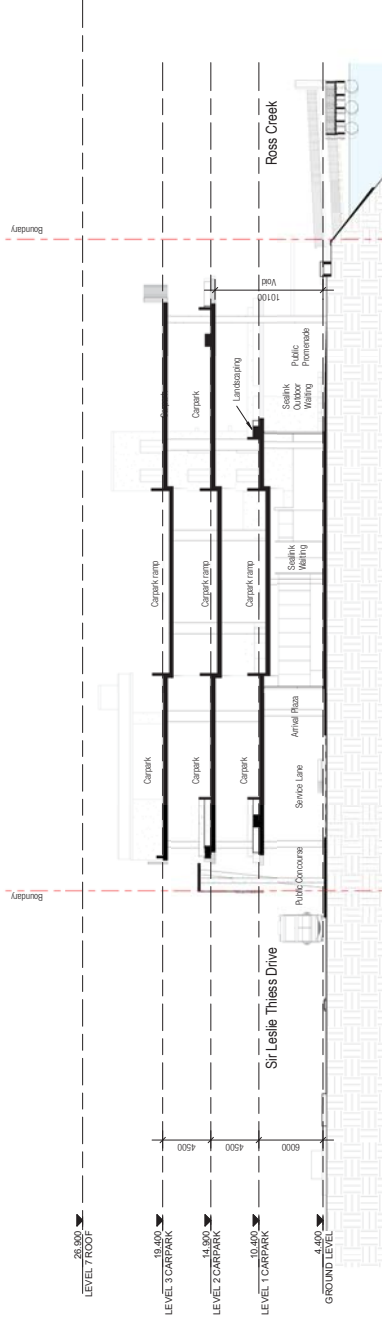
CLIENT: HONEYCOMBES PROPERTY GROUP
PROJECT: DEVELOPMENT APPLICATION
ADDRESS: TOWNSVILLE MARINE TOURISM PRECINCT

DATE	BY	FOR
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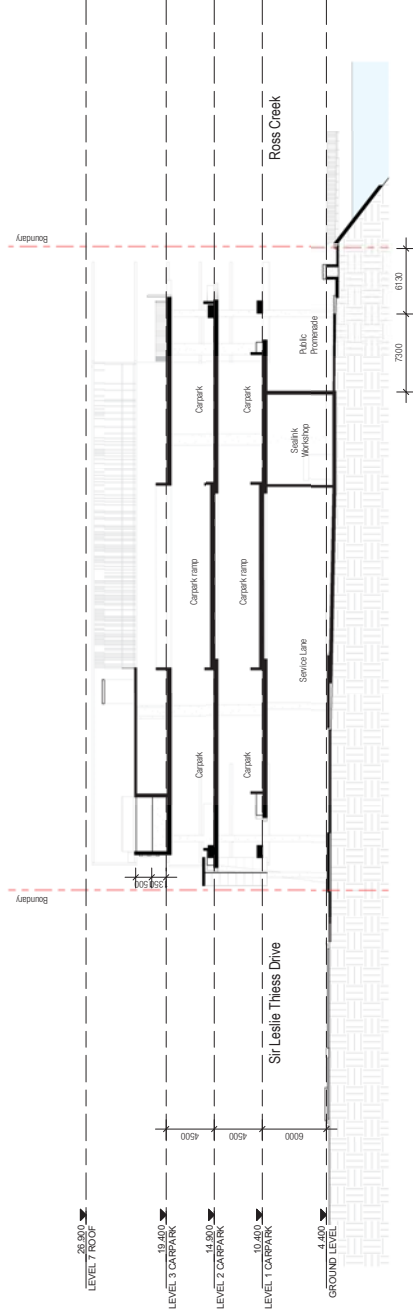
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DA ISSUE



1 DA - CROSS SECTION 1
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2 DA - CROSS SECTION 2
SCALE 1:250

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DA ISSUE

DRAWING TITLE: CROSS SECTIONS		DATE: 30.08.19
DRAFTING REF: CONTAINING: MTP, Central Heating J.C. element		REVISION:
PROJECT NO: 19050	PHASE: DA	DRAWING NUMBER: DA.501
		4

ANNEXURE B
REVISED SUBMISSION REQUIREMENTS (9 AUGUST 2019)

TOWNSVILLE CITY WATERFRONT PDA
Townsville Marine Terminal Precinct
CHANGE APPLICATION
DEV2019/1027

REQUIRED MATERIALS		
Document	Needed Content	Provided
Plans	Revised set of plans: • Site Plan, Development Summary, Floor Plans, Elevations, Sections • Gross Floor Area • # parking spaces and space types • Materials palette – built form and public realm	
Planning Report	Revisions to relevant sections of planning report addressing: • Description of proposal • Confirm Description of Development and Proposed Land Uses (definitions) • Assessment of general compliance with development scheme and design guideline (focus on precinct provisions and relevant waterfront design guideline provisions) • Any relevant proposal details not provided via other plans and documents • Confirm where no changes to documents required for decision making purposes (e.g. acoustics, air quality, lighting, landscaping, stormwater management etc.)	
Traffic and Transport Impact Assessment Report	Revisions to the following sections of the report (where required as a result of the Applicant chosen development option): • Section 4 – Development Traffic • Section 5 – Impact Assessment and Mitigation • Section 6 – Conclusions and Recommendations Swept path analysis for all relevant vehicle types.	
Public Passenger Transport Assessment Report	Revisions to the following sections of the report (where required as a result of the Applicant chosen development option): • Section 3 – Proposed Development Details • Section 4 – Development Traffic • Section 5 – Impact Assessment and Mitigation • Section 6 – Conclusions and Recommendations Note: A graphic presentation on a site plan of the information contained Appendix D – Development Traffic Volumes on the Network (including pedestrians and bicycles) is specifically requested.	
Infrastructure Charges	Summary of discussions with Council regarding infrastructure charges: • Points of agreement and disagreement • Key dates Infrastructure charges calculation proposed to Council	

NOTES:

1. Revisions to the above listed technical reports can either be amended reports, or technical note / addendum / letter to the reports, whichever is identified as most appropriate by the Applicant and their consultants.
2. Revisions to acoustic report, air quality report, lighting report, landscape plans/information, stormwater management plan, not sought as:
 - Sufficient information is available in the originally submitted documents for EDQ to determine that design revisions will not alter the general ability to comply with the relevant standards and/or criteria;
 - Compliance with relevant standards and criteria can be achieved through conditions; and
 - We anticipate a majority of these items will all require compliance assessment conditions to ensure detailed design meets relevant standards and/or criteria.

ANNEXURE C
AMENDMENTS TO THE SERVICE LANE EMAIL (30 AUGUST 2019)

Bradley Jones

From: Peter Honeycombe <peterh@honeycombes.com>
Sent: Friday, 30 August 2019 2:11 PM
To: Jason Clarke; Bradley Jones
Cc: Vanessa Honeycombe; Andrew Dowling; Blair Shillington; Terry McQuillan <terrym@bureauproberts.com.au> (terrym@bureauproberts.com.au); Mark Kennedy (mark@cpoint.com.au)
Subject: FW: TMTP - Amendments to the Service Lane
Attachments: TMTP - EDQ Additions to Honeycombes Sketch up 30 Aug 2019.pdf

FYI and action accordingly.

Best Regards,

Peter Honeycombe
Managing Director



T: (07) 4760 2910 | M: 0418 778 779
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From: Anne Edmonds [mailto:Anne.Edmonds@dsdmip.qld.gov.au]
Sent: Friday, 30 August 2019 2:08 PM
To: Peter Honeycombe
Cc: Rachael Grimes; Vanessa Honeycombe; Andrew Dowling; 'George Milford'; Sarah Jones (sjones@milfordplanning.com.au); Blair Shillington
Subject: RE: TMTP - Amendments to the Service Lane

Hello Peter,

Further to our emails yesterday, I have now received DTMR comment on the attached sketches.

EDQ Summary of Key Feedback:

- DTMR have advised that the sketch as marked up by EDQ (attached) shows the extent of private vehicle pick-up and drop-off considered acceptable in the 'service lane'.
- There will be a need to work through aspects of the detailed design of the 'service lane', once the revised proposal is submitted by the Applicant. However if the bus stops, PWD spaces, private vehicle pick-up and drop-off spaces and the pedestrian crossing in the 'service lane' are located to maximise pedestrian safety

and minimise bus and other vehicle conflict points, that detail can be worked through in the final assessment by EDQ and/or compliance assessment conditions criteria.

- The taxi rank can be placed in the 'service lane' opposite the bus stops. (Note: This is an option, not a requirement. This statement is not intended to infer the 'service lane' is a better or worse location than the taxi rank being proposed on The Strand – simply that taxi and bus interactions pose less conflict than bus and private vehicle pick-up and drop-off).

EDQ Summary of Other Comments:

- There will still be a volume of private vehicle travelling past the bus stops in the 'service lane' - the traffic assessment information should identify how potential vehicle conflict resulting from this can be minimised.
- The swept path analysis for buses as well as the maximum design vehicle should be provided.
- The plans, when submitted, should show the length and width of all bus and coach stops and layover locations.
- On the plans identify if the PWD space in the 'service lane' is a general PWD space, or a taxi rank PWD space.
- Inclusion of 1 taxi PWD space at the start of the taxi rank for the facility is sought, regardless of the taxi rank location or the PWD space in the 'service lane'.

Kind Regards,
Anne

Anne Edmonds
Manager, Development Assessment
Economic Development Queensland
Department of State Development, Manufacturing,
Infrastructure and Planning
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From: Peter Honeycombe <peterh@honeycombes.com>
Sent: Thursday, 29 August 2019 5:51 PM
To: Anne Edmonds <Anne.Edmonds@dsdmip.qld.gov.au>
Cc: Rachael Grimes <Rachael.Grimes@dsdmip.qld.gov.au>; Vanessa Honeycombe <vanessah@honeycombes.com>; Andrew Dowling <andrewd@honeycombes.com>; 'George Milford' <gmilford@milfordplanning.com.au>; Sarah Jones <sjones@milfordplanning.com.au> <sjones@milfordplanning.com.au>; Blair Shillington <blairs@honeycombes.com>
Subject: RE: TMTP - Amendments to the Service Lane

Thanks Anne

Best Regards,

Peter Honeycombe
Managing Director



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From: Anne Edmonds [<mailto:Anne.Edmonds@dsdmip.qld.gov.au>]

Sent: Thursday, 29 August 2019 5:47 PM

To: Peter Honeycombe

Cc: Rachael Grimes; Vanessa Honeycombe; Andrew Dowling; 'George Milford'; Sarah Jones (sjones@milfordplanning.com.au); Blair Shillington

Subject: RE: TMTP - Amendments to the Service Lane

Afternoon Peter,

Thank you for the sketch attached. I have provided it to DTMR for review and comment and will respond as soon as possible. I will check in with them first thing tomorrow.

As per our telephone conversation yesterday, my general and very high level discussions with DTMR indicated that the bus parking on the left and private vehicle pick-up drop-off to the right of the service lane from the point of the entry/exit to the car park onwards was the area of most concern in the service lane from a conflict and bus operation perspective. Noting this, review of all of the private vehicle pick-up drop-off forward of the car park entry/exit may need to be considered. However I will provide more formal comment on this once I hear back from DTMR.

Kind regards,
Anne



Anne Edmonds
Manager, Development Assessment
Economic Development Queensland
Department of State Development, Manufacturing,
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From: Peter Honeycombe <peterh@honeycombes.com>

Sent: Thursday, 29 August 2019 8:37 AM

To: Anne Edmonds <Anne.Edmonds@dsdmip.qld.gov.au>

Cc: Vanessa Honeycombe <vanessah@honeycombes.com>; Andrew Dowling <andrewd@honeycombes.com>; George Milford (gmilford@milfordplanning.com.au) <gmilford@milfordplanning.com.au>; Sarah Jones (sjones@milfordplanning.com.au) <sjones@milfordplanning.com.au>; Blair Shillington <blairs@honeycombes.com>
Subject: FW: TMTP - Amendments to the Service Lane

Morning Anne

As per our conversation yesterday our consultants have been instructed and made the amendments as per the attached.

We have received back information from both the architects and traffic engineers now advancing the amendments overall and will have all to Milford by COB tomorrow to allow them to hopefully resubmit early next week.

Thanks again for your assistance and as discussed if you have further feedback if you could include me personally in discussions with Milford that would assist in expediting the progress of a resolution.

Best Regards,

Peter Honeycombe
Managing Director



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From: Peter Honeycombe
Sent: Wednesday, 28 August 2019 3:55 PM
To: Jason Clarke; Bradley Jones (Bradley.Jones@premise.com.au)
Cc: Vanessa Honeycombe; Andrew Dowling; Blair Shillington; Sarah Jones (sjones@milfordplanning.com.au)
Subject: TMTP - Amendments to the Service Lane

Jason and Brad

We have received feedback from TMR that they are concerned with potential conflict of the various modes of transport in the Service Lane.

I have marked up the plan attached. Can you please consider the following amendments:

- A. Reduce the number of passenger set down bays on the SLTD side by 5 bays
- B. Move the PWD bay as far along the Service Lane as possible
- C. Move ped crossing as far along the Service Lane as possible
- D. Move buses as far along Service Lane as possible
- E. Include an additional passenger set down by adjoining bay market 21.
- F. Total passenger bays of 16 instead of 21. Preferably more but need to keep bare minimum cars opposite buses on the Service Lane.

I will call to discuss.

Best Regards,

Peter Honeycombe
Managing Director



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ANNEXURE D
TRAFFIC AND TRANSPORT IMPACT ASSESSMENT (17 APRIL 2019)



Premise

HONEYCOMBES PROPERTY GROUP

TOWNSVILLE MARINE TOURISM PRECINCT
FERRY TERMINAL
CNR THE STRAND AND SIR LESLIE THEISS DRIVE

TRAFFIC AND TRANSPORT IMPACT ASSESSMENT

Report No: HON0031/R01

Rev: B

Date: 17 April 2019



ENGINEERING



ENVIRONMENT



AGRICULTURE



WATER

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Appendix B	SIDRA Output – Existing Conditions The Strand / Sir Leslie Thiess Drive
Appendix C	Development Site Plan
Appendix D	Roadworks Layout Plans
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Appendix J	Traffic Impact Assessment Certification

DOCUMENT AUTHORISATION					
Revision		Rev. Date		Report Details	
Draft		5 February 2019		For comment	
A		1 March 2019		For submission	
B		17 April 2019		Hotel increased to 99 rooms	
Prepared By		Reviewed By		Authorised By	
Daniel Marais	<i>DMarais</i>	Bradley Jones RPEQ	<i>Bradley Jones</i>	Bradley Jones	<i>Bradley Jones</i>

EXECUTIVE SUMMARY

Honeycombes Property Group is proposing a new ferry terminal at the Townsville Marine Tourism Precinct located on the corner of The Strand and Sir Leslie Thiess Drive. The proposed ferry terminal is expected to commence operation in 2020 and consist of:

- 1,345m² ferry terminal and bus hub including waiting areas, ferry operator offices and workshop;
- 99 room hotel with 306m² restaurant/bar;
- 474m² commercial tenancy;
- 506m² research & educational facility;
- 682m² of retail across two (2) tenancies; and
- 461 space multi-level car park plus coach / taxi zones.

Proposed roadworks associated with the development:

- Removal of one (1) northbound lane on Sir Leslie Thiess Drive and realignment of the two (2) southbound lanes to accommodate southbound bus parking on the site frontage;
- Construction of a concrete median on Sir Leslie Thiess Drive for the full length of the subject site's frontage;
- Proposed new access road on the northern site frontage to access the proposed hotel's porte cochere with a new all movements priority intersection on Sir Leslie Thiess Drive opposite the Breakwater apartments' access; and
- A left-in-left-out access to the multi-level car park on Sir Leslie Thiess Drive roughly midway between The Strand and the new access road.

The study area for this report consists of the geometric frontage of the site on Sir Leslie Thiess Drive and the Strand including the Strand / Sir Leslie Thiess Drive intersection.

The proposed development is conservatively estimated to generate up to 507 vehicles per hour (vph) during peak periods. Therefore, the development is assessed as having a high impact in accordance with the Townsville City Plan SC6.4.3.14.

This Traffic and Transport Impact Assessment concludes that:

- Proposed changes to the road environment on Sir Leslie Thiess Drive will not require a road safety audit but should be subject to a road safety assessment. A road safety assessment may be conducted by either an accredited road safety auditor or a registered professional engineer of Queensland (RPEQ);
- Site access arrangements shown by the Roadworks Layout Plans attached in Appendix D comply with turn warrant assessments in accordance with the "Supplement to Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections" (Transport and Main Roads, August 2014);
- Intersection analysis was conducted with SIDRA. Both the proposed access road / Sir Leslie Thiess Drive intersection and the left-in-left-out car park access on Sir Leslie Thiess Drive are expected to operate well below their practical capacities, with short delays and very short queues;

- The proposed locations of access intersections provide acceptable sight distance and maintain acceptable sight distance at the Strand / Sir Leslie Thiess Drive intersection;
- Flow scale analysis was carried out for the two (2) access intersections and the Strand / Sir Leslie Thiess Drive intersection. The critical intersection was found to be the new all-movement access road intersection. The flow scale reported for this intersection was 241%, that is, “with development” through traffic volumes could more than double before either the study area road network reaches its practical capacity or delays at any intersection reach an unacceptable level;
- The bus stop geometry shown by the Roadworks Layout plan attached in Appendix D is generally in accordance with the Townsville City Planning Scheme SC6.4.4.8.5; and
- Proposed changes to pedestrian facilities on Sir Leslie Thiess Drive as shown by the Roadworks Layout Plans attached in Appendix D will improve connectivity and amenity as well as reducing conflict between pedestrians and vehicles at the proposed new access road intersection.

1 INTRODUCTION

Premise Australia Pty Ltd (Premise) was engaged by Honeycombes Property Group to undertake a Traffic and Transport Impact Assessment for the proposed development located at the Townsville Marine Tourism Precinct, Sir Leslie Thiess Drive, Townsville City in accordance with Townsville City Plan SC6.4.3.14 and the "Guide to Traffic Impact Assessment" (Department of Transport and Main Roads, December 2018).

1.1 Level of Assessment

The development is assessed as having a high impact in accordance with Townsville City Plan SC6.4.3.14 based on:

- Location in the CBD;
- Peak hour trip generation of up to 507 vehicles per hour (vph);
- Generation of approximately 50 bus movements per day;
- Construction of a 461-space multi-level on-site car park;
- Designation of bus zones on Sir Leslie Thiess Drive to accommodate four (4) buses / coaches; and
- No change to existing transport network operation.

1.2 Scope and Study Area

Figure 1-1 shows the impact assessment area which consists of the geometric frontage of the site including:

- Sir Leslie Thiess Drive;
- The Strand; and
- The Strand / Sir Leslie Thiess Drive T-intersection.



Figure 1-1: Impact assessment area

The construction period is expected to commence in 2019 with opening of the development expected in 2020.

The impact mitigation period for access intersections is 10 years after the opening of the final stage resulting in a design year of 2030.

1.3 Pre-Lodgement Meeting Notes

Appendix A contains advice received from the Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP) in relation to the Development Application for the proposed development.

2 EXISTING CONDITIONS

2.1 Land Use and Zoning

The subject site is bounded by Sir Leslie Thiess Drive to the west, the Strand to the south, Ross Creek to the east and the existing Sealink ferry terminal to the north. Currently, the site is occupied by two (2) vacant buildings and the existing Sealink ferry terminal car park.

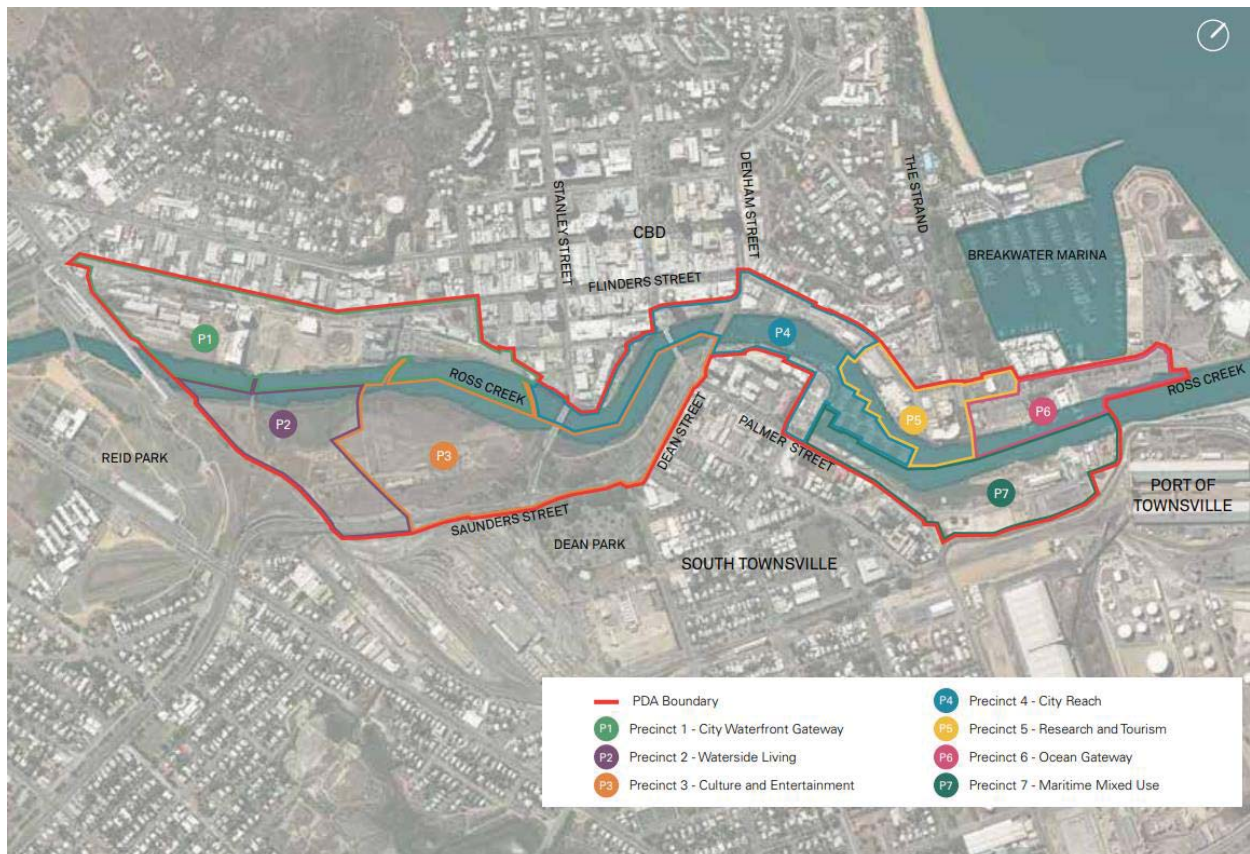


Figure 2-1: Subject site and surrounding area land use (PDA Scheme, October 2015)

The development site is located within Precinct 6 Ocean Getaway of the Townsville City Waterfront Priority Development Area (PDA) as shown by Figure 2-1. As the development site falls within the PDA the Minister for Economic Development Queensland (MEDQ represented by DSDMIP) is the assessing authority for the proposed development.

The development site also forms part of the Townsville Port Master Plan. The Townsville Port Master Plan indicates that the development site is located within the:

- Marine services and recreation precinct; and
- Port industry and commerce precinct.

2.2 Adjacent Land Uses / Approval

The PDA covers land fronting Ross Creek from Reid Park in the West to the Port of Townsville in the East. The PDA is broken up into seven (7) precincts with Precinct 5 Research and Tourism covering land to the south of the development site across the Strand and west across Sir Leslie Thiess Drive.

Figure 2-2 shows current land uses surrounding the development site. Enterprise House is located to the west opposite the development site on Sir Leslie Thiess Drive and is located within Precinct 5 Research and Tourism of the PDA. Townsville Enterprise has access points on both The Strand and Sir Leslie Thiess Drive. The Strand access is an entry only and the Sir Leslie Thiess Drive access is a combined entry / exit.

Immediately to the North of Enterprise House is Breakwater Villas consisting of 69 residential units. Breakwater Villas is located outside the PDA.

To the North of the development site and the existing Sealink ferry terminal, at the end of Sir Leslie Thiess Drive, is the Townsville Entertainment & Convention Centre and the Ville Resort Casino located outside the PDA.



Figure 2-2: Land uses surrounding the development site

Land use to the South of The Strand is located within Precinct 5 Research and Tourism of the PDA. Immediately to the south of the development site across the Strand are Harbour City apartments (226 units) and a vacant apartment building.

On the opposite side of Ross Creek to the development site is Precinct 7 Maritime Mixed Use of the PDA. The Townsville Port masterplan specifies this area to form part of the:

- Marine services and recreation precinct; and
- Port industry and commerce precinct.

2.3 Surrounding Road Network Details

The surrounding road network is shown by Figure 1-1. The development site has frontage to Sir Leslie Thiess Drive and The Strand.

2.3.1 Sir Leslie Thiess Drive

Sir Leslie Thiess Drive is a major collector under the governing authority of Townsville City Council. For ease of reference, Sir Leslie Thiess Drive is described in this report as being generally aligned north-south between the strand in the south and The Ville Resort Casino in the north. It features a divided four (4) lane carriageway for two-way traffic flow with a two (2) metre wide pedestrian/cycle path on its Western side (opposite the subject site) as shown by Figure 2-3. Sir Leslie Thiess Drive has a posted speed limit of 50km/h and kerb side parking is currently not permitted.



Figure 2-3: Sir Leslie Thiess Drive typical cross section

2.3.2 The Strand

The Strand is a major collector under the governing authority of Townsville City Council. For ease of reference, the Strand is described in this report as being generally aligned east-west between Kissing Point in the west and Ross Creek in the east where it forms a dead-end. On the subject site frontage, the Strand is a divided carriageway with one (1) lane for eastbound traffic and two (2) lanes for westbound traffic as shown by Figure 2-4. Generally, parking bays are marked on both sides of the Strand. The Strand has a posted speed limit of 50km/h in the study area.



Figure 2-4: The Strand cross section between King Street and Sir Leslie Thiess Drive looking West

2.3.3 The Strand / Sir Leslie Thiess Drive

The Strand and Sir Leslie Thiess Drive form a priority-controlled (give way) T-intersection on the local government road network with Sir Leslie Thiess Drive being the priority road. Figure 2-5 shows that eastbound and westbound traffic on The Strand are faced with give-way signs requiring them to yield to traffic turning right from Sir Leslie Thiess Drive to the Strand westbound.



Figure 2-5: The Strand / Sir Leslie Thiess Drive t-intersection

2.4 Traffic Volumes

Traffic volumes in the study area were estimated based on land use within the Sir Leslie Thiess Drive catchment. Trip generation rates were obtained from the "Breakwater and Associated Developments: Assessment of Peak Hour Traffic Volumes" (TCC Breakwater Report), dated 11 December 2007, by C & G Horman Pty Ltd for Townsville City Council.

Figure 2-2, shows the land uses that have been assumed in estimating existing traffic volumes on the development site frontage.

Note that traffic generation has not been included for:

- The Townsville Entertainment & Convention Centre as traffic generated by this centre will be due to events which are unlikely to coincide with commuter peak periods and, if they did, would likely require an event traffic management plan to be implemented; and
- Apartments located on the eastern end of the Strand which are currently vacant and, if occupied, would be accessed from the rear, via King Street.

Table 2-1 adapted from the TCC Breakwater Report, shows the assumed traffic generation rates for various development types in the Townsville Breakwater Area.

Table 2-1: Traffic Generation Rates (TCC Breakwater Report, 2007)

Development Type	Trip Generation		Directional Split			
	Morning Peak Hour	Evening Peak Hour	Morning Peak Hour		Evening Peak Hour	
			Outbound	Inbound	Outbound	Inbound
Detached houses	0.85-1 trips/hr/lot	0.8-0.9 trips/hr/lot	70%	30%	30%	70%
Residential units	0.5 trips/hr/unit	0.45 trips/hr/unit	70%	30%	30%	70%
Casual accommodation	0.4 trips/hr/unit		70%	30%	30%	70%
Commercial	1 trip/hr/100m ² GFA	5 trip/hr/100m ² GFA	0%	100%	60%	40%
Ferry Terminal	1.2 trips/hr/parking space		30%	70%	70%	30%
Entertainment	5 trip/hr/100m ² GFA		0%	0%	60%	40%

GFA – Gross Floor Area

The trip generation rates shown in Table 2-1 and data contained in the TCC Breakwater Report were used to determine appropriate trip generation rates for each land use as shown in Table 2-2. The total trip generation is also shown for each land use in Table 2-2.

Table 2-2: Adopted Traffic Generation Rates

Land Use	Scale	Unit	Trip Generation Rate (per unit)	Total Trip Generation (two-way)
Detached Houses	26	dwelling	0.85vph	22vph
The Ville Resort	194	rooms	0.4vph	78vph
Existing Ferry Terminal	125	spaces	1.2vph	150vph
Breakwater Villas	69	units	0.45vph	31vph
Townsville Enterprise	145	spaces	1.2vph	174vph
Harbour City	226	units	0.5vph	113vph

vph – vehicles per hour

A directional split of 70 : 30 was used for all developments during both peaks. During the morning peak hour, the peak direction is outbound except for the Ferry Terminal and Townsville Enterprise. During the evening peak hour, the peak directions of travel are the reverse of the morning peak hour.

Using the trip generation estimated in Table 2-2 and the directional splits detailed above, Table 2-3 summarises the traffic volumes estimated for each of the land uses in the morning and evening peak hours.

Table 2-3: Estimated Existing Traffic Volumes

Land Use	Morning Peak Hour		Evening Peak Hour		Land Use Total
	Outbound	Inbound	Outbound	Inbound	
Dwelling houses	15vph	7vph	7vph	15vph	44vph
The Ville Resort	54vph	23vph	23vph	54vph	155vph
Existing Ferry Terminal	45vph	105vph	105vph	45vph	300vph
Breakwater Villas	22vph	9vph	9vph	22vph	62vph
Townsville Enterprise	52vph	122vph	122vph	52vph	174vph
Harbour City	79vph	34vph	34vph	79vph	226vph
Peak Hour Total	267vph	300vph	300vph	267vph	567vph

Figure 2-6 shows the morning peak hour traffic volumes on the existing road network and Figure 2-7 shows the evening peak hour traffic volumes. Traffic travelling to / from the dwelling houses, The Ville Resort and the existing ferry terminal are shown as accessed via Sir Leslie Thiess Drive North of the proposed development. The Breakwater Villas access and egress is from Sir Leslie Thiess Drive within the study area. It has been assumed that all inbound Enterprise House traffic will use the Strand access and all outbound traffic will use the Sir Leslie Thiess Drive access. The Strand access has been excluded from the traffic model as it falls outside the study area of this assessment. Harbour City is shown as accessed via The Strand to the East of Sir Leslie Thiess Drive.

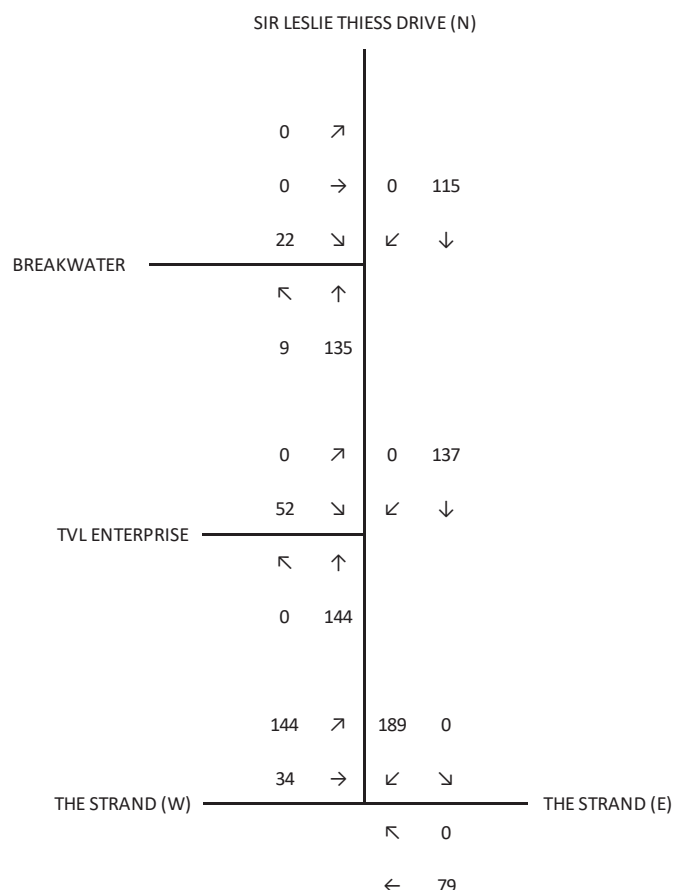


Figure 2-6: Existing morning peak hour traffic volumes on the existing road network

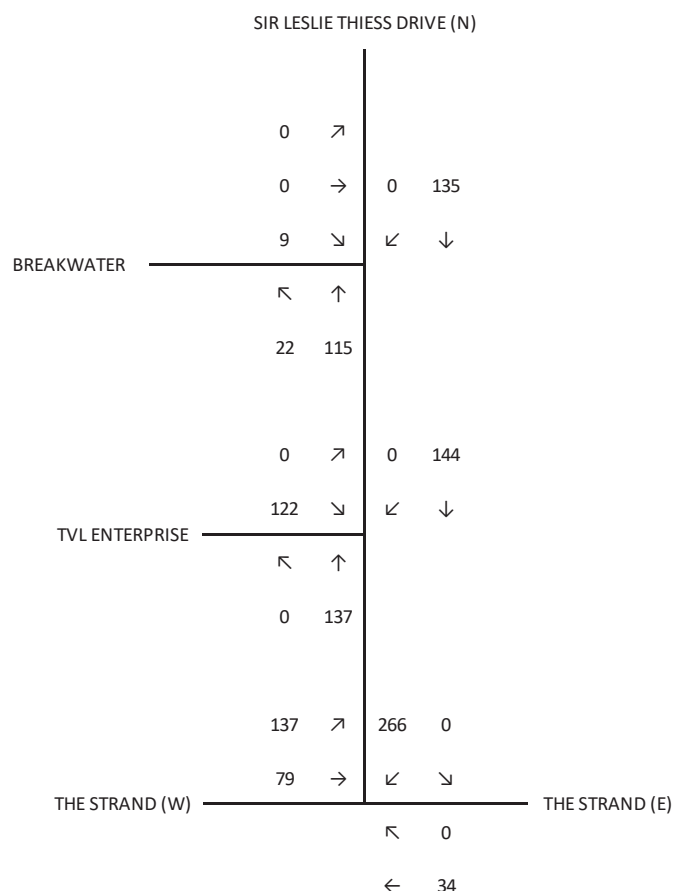


Figure 2-7: Existing evening peak hour traffic volumes on the existing road network

2.5 Intersection Performance

Intersection performance has been assessed using SIDRA Intersection Version 8 Network (SIDRA). SIDRA is an advanced micro-analytical traffic tool for evaluation of intersections. The SIDRA network model determines the backward spread of congestion as queues on downstream lanes block upstream lanes and applies capacity constraint to oversaturated upstream lanes, thus limiting the flows entering downstream lanes.

SIDRA reports intersection performance in terms of a range of parameters including:

- **Demand Volumes (V):** The modelled number of vehicles arriving at the intersection during the assessment hour. Demand volume is calculated by dividing the peak hour volume by the peak flow factor (PFF). SIDRA's default PFF of 95% has been adopted for all movements;
- **Degree of Saturation (DoS):** The ratio of the demand volume, V, to the theoretical capacity. A priority intersection is considered to be operating at its practical capacity when the DoS reaches 0.80;
- **Average Delay (D):** The mean control delay including both queuing delay and geometric delay for all vehicles arriving during the assessment period including the delay experienced after the end of the flow period until the departure of the last vehicle arriving during the flow period; and

- **95th Percentile Back of Queue Length (Q):** The maximum backward extent of the queue relative to the stop line or give-way / yield line during a signal cycle or gap acceptance cycle below which 95% of all queue lengths fall. The 95th percentile back of queue length is generally accepted as the maximum queue length for design purposes.

2.5.1 The Strand / Sir Leslie Thiess Drive Intersection

SIDRA was used to analyse The Strand / Sir Leslie Thiess Drive intersection using the estimated existing morning and evening peak hour traffic volumes shown by Figure 2-6 and Figure 2-7, and assuming a heavy vehicle percentage of 5%. Appendix B shows the SIDRA output results for the intersection. Key outputs from the SIDRA model are:

- The maximum DoS is 0.095, which is well below practical capacity;
- The maximum average delay to any movement is 6.2sec, which is considered very short; and
- Maximum queue lengths do not exceed one (1) vehicle.

Table 2-4: SIDRA Output – The Strand / Sir Leslie Thiess Drive Intersection, Without Development

Movement	AM Peak				PM Peak			
	V	DoS	D	Q	V	DoS	D	Q
East Approach: The Strand (E)								
Through	83veh	0.034	4.2sec	0.1veh	36veh	0.016	4.5sec	0.1veh
Right	1veh	0.001	5.6sec	0.0veh	1veh	0.001	6.2sec	0.0veh
North Approach: Sir Leslie Thiess Drive (N)								
Left	1veh	0.056	4.7sec	0.0veh	1veh	0.078	4.7sec	0.0veh
Right	199veh	0.056	4.7sec	0.0veh	280veh	0.078	4.7sec	0.0veh
West Approach: The Strand (W)								
Left	152veh	0.095	5.7sec	0.4veh	144veh	0.090	5.7sec	0.4veh
Through	36veh	0.030	5.2sec	0.1veh	83veh	0.074	5.5sec	0.3veh

2.6 Site Access

Existing access to the development site is via The Strand and Sir Leslie Thiess Drive. The two (2) vacant buildings on the Southern portion of the development site are provided with access driveways on The Strand. The northern section of the development site has two (2) access points. One (1) access is via the existing SeaLink ferry terminal site which itself accesses Sir Leslie Thiess Drive to the north of the development site. The other access is via the Strand through an access driveway running adjacent to Ross Creek connecting to the northern section of the development site. This access driveway is referred to in some documentation as Breakwater Road but is neither a gazetted road nor an access easement.

2.7 Public Transport

Local public transport operating in the study area consists of taxi, bus and ferry services.

2.7.1 Taxis

Taxi services operate from a passenger specified origin to a destination and are ordered by phone or through the website.

2.7.2 Buses

Local bus services in Townsville are operated by Sunbus and have two (2) routes operating in the study area being Routes 200 and 201.

Route 200 connects the ferry terminal to Kelso via Townsville City, Ross River Road, Stocklands Shopping Centre, Willows Shopping Centre and Riverway Drive. On weekdays, Route 200 operates at 20min intervals from the arrival of the first bus at 6:45AM until the departure of the 6:25PM outbound service. At other times, Route 200 provides hourly services which:

- On weekday evenings depart at five (5) minutes to the hour from 6:55PM to 10:55PM; and
- On weekends depart at 25minutes passed the hour from 7:25AM to 11:25PM on Saturdays and 8:25PM to 5:25PM on Sundays.

Route 201 connects the ferry terminal to James Cook University via Townsville City, Charters Towers Road, Ross River Road, Stockland Shopping Centre and Nathan Street. On weekdays, Route 201 operates at 20min intervals from the departure of the first bus at 6:55AM until the arrival of the 6:45PM inbound service. At other times Route 201 provides hourly services which:

- On weekday evenings depart at 25 minutes passed the hour from 7:25PM to 11:25PM; and
- On weekends depart at five (5) minutes to the hour from 6:55AM to 10:55PM on Saturdays and 7:55AM to 10:55PM on Sundays.

The existing SeaLink ferry terminal is also a drop-off / pick-up point for a number of long-distance bus services including interstate coaches.

2.7.3 Ferries

SeaLink ferry services connect the SeaLink ferry terminal to the Nelly Bay ferry terminal on Magnetic Island. Ferries arrive at the SeaLink Ferry terminal and depart 15 to 20 minutes later. On weekdays, ferries depart from the SeaLink ferry terminal from 5:30AM to 7:15PM, with Ferries arriving every 20 to 60 minutes. On weekdays there are two (2) late ferries that depart at 9:00PM and 10:30PM. On Friday and Saturday, ferries operate similar to the weekday schedule but with an additional service departing at 11:30PM.

SeaLink also operate ferry services to / from Palm Island. A single services travels from the mainland to Palm Island and back each day from Thursday to Monday.

2.8 Active Transport

Active transport facilities in the vicinity of the development site are shown by Figure 2-8. Pedestrian paths are provided on both sides of all streets in the vicinity of the development site but not on the frontage of the development site. A shared path is aligned between Breakwater Villas and Enterprise House to connect Sir Leslie Thiess Drive to open space to the west. Pedestrian refuges are provided for crossing:

- The Strand on the western leg of the King Street intersection; and
- Sir Leslie Thiess Drive at the end of the shared path link to open space to the west.



Figure 2-8: Existing active transport facilities

3 PROPOSED DEVELOPMENT DETAILS

3.1 Development Site Plan

Honeycombes Property Group provided Counterpoint drawings DA100-DA207 received 16/4/2019 (refer Appendix C) showing that the proposed development is to consist of:

- 1,345m² ferry terminal and bus hub including waiting areas, ferry operator offices and workshop;
- 99 room hotel with 306m² restaurant/bar;
- 474m² commercial tenancy;
- 506m² research & educational facility;
- 682m² of retail across two (2) tenancies; and
- 461 space multi-level car park plus coach / taxi zones.

3.2 Operational Details

The proposed development is expected to commence operation in 2020.

The proposed SeaLink ferry terminal is expected to operate throughout the day (refer Section 2.7.3) with peak periods coinciding with the peak periods for adjacent street traffic. Therefore, morning and evening commuter peak hours are assessed.

3.3 Proposed Access and Parking

Attached in Appendix D is the proposed Roadworks Layout Plan for the Townsville Marine Tourism Precinct Drawing/Sketch No: STP18-1390-SKC001 to SKC003 received 1/3/19. It shows:

- Removal of one (1) northbound lane on Sir Leslie Thiess Drive and realignment of the two (2) southbound lanes to accommodate southbound bus parking on the site frontage;
- Construction of a concrete median on Sir Leslie Thiess Drive for the full length of the subject site's frontage;
- Proposed new access road on the northern site frontage to access the proposed hotel's porte cochere with a new all movements priority intersection on Sir Leslie Thiess Drive opposite the Breakwater apartments' access; and
- A left-in-left-out access to the multi-level car park on Sir Leslie Thiess Drive roughly midway between The Strand and the new access road.

4 DEVELOPMENT TRAFFIC

4.1 Traffic Generation

Traffic generated by the proposed development has been estimated based on data provided by SeaLink, refer Appendix E, and traffic generation rates specified in the TCC Breakwater Report and Trip Generation Manual, 9th edition, ITE 2012.

The following sections discuss the traffic generated by the following development components:

- Ferry terminal;
- Bus hub;
- Hotel and restaurant / bar;
- Commercial tenancy; and
- Retail.

Note that the research & education facility has conservatively been assumed to generate traffic at the same rate as a commercial tenancy.

The traffic generation of ferry operator offices, workshop and car parking components of the development are considered to be included in the estimated traffic generation of the ferry terminal and bus hub.

4.1.1 Ferry Terminal Generation

The advice provided by SeaLink in Appendix E indicates that the ferry terminal is expected to generate 75,000 car drops and 75,000 car movements (parking) per annum. It is assumed that this movement data is inclusive of ferry terminal passenger and staff movements.

Car drops are assumed to include trips by taxi, ride share (e.g. Uber) as well as drop-off / pick-up by family / friend. It is assumed that car drops will take place in the turnaround area at the eastern end of the Strand. Car drops are assumed to generate four (4) trips per day being one (1) inbound and one (1) outbound trip in the morning (drop-off) and one (1) inbound and one (1) outbound trip in the afternoon (pick-up).

Car movements (parking) are to be accommodated by 320 of the on-site parking spaces based on Sealink advice in Appendix E. It is assumed that parking cars will generate two (2) trips per day being one (1) inbound trip in the morning and one (1) outbound trip in the afternoon.

With roughly equal numbers of cars parking and car drops, it is expected that the directional split for ferry terminal traffic will be roughly two (2) to one (1) with the peak direction being inbound in the morning and outbound in the afternoon.

The TCC Breakwater Report estimated that the ferry terminal generates traffic at the rate of 1.2 trips per parking space with a 70:30 directional split. This directional split is consistent with the two (2) to one (1) directional split estimated above. The traffic generation rate of 1.2 trips per hour per parking space implies that 40% of the 320 ferry terminal parking spaces fill up during the morning peak hour and 40% empty during the evening peak hour with a similar number of car drops. This is considered reasonable.

Therefore, it is estimated that:

- The 320 ferry terminal parking spaces generate 128 vehicle trips during peak hours (inbound in the morning and outbound in the evening); and
- Passenger unloading / loading at the eastern end of the Strand generates 128 inbound and 128 outbound vehicle trips during both peak hours.

4.1.2 Bus Hub Generation

Bus movements generated by the bus hub were estimated by SeaLink to be:

- 3,000 coach movements per year;
- 500 tourist bus connections per year;
- 8,000 local bus connections per year; and
- 3,000 school bus connections per year.

A "movement", as referred to by SeaLink, is conservatively assumed to consist of two (2) trips being one (1) inbound trip and one (1) outbound trip.

With an estimated total of 3,500 tourist bus / coach movements per year and assuming that tourist bus / coaches operate 365 days in the year, it is estimated that there will be 10 tourist bus / coach movements per day. Furthermore, it has been conservatively assumed that there will be one (1) tourist bus / coach movement (one (1) inbound trip and one (1) outbound trip) in both the morning and evening peak hour.

With an estimated 8,000 local bus movements per year and an estimated 300 days of operations (excluding Sundays and public holidays), it is estimated that there will be 27 local bus movements per day. Local buses are expected to operate all day. Therefore, with reference to SeaLink provided data, it is expected that there will be three (3) movements per hour during peak periods. However, Sunbus data, refer Section 2.7.2, indicates that there will be at least six (6) inbound buses and six (6) outbound buses during peak hours. It has therefore been assumed that there will be six (6) local bus movements (six (6) inbound trips and six (6) outbound trips) in both the morning and evening peak hours.

Based on 3,000 school bus movements over the approximately 200 school days in a year, it is estimated that there will be 15 school bus movements per day. School buses are expected to operate before and after school, with the before school services coinciding with the morning commuter peak hour and the after school services occurring before the evening commuter peak hour. Therefore, it has been conservatively assumed that there will be seven (7) school bus movements (seven (7) inbound trips and seven (7) outbound trips) during the morning peak hour.

4.1.3 Hotel and Restaurant/Bar Generation

Traffic generation rates for the hotel and restaurant / bar were obtained from the TCC Breakwater Report (refer Table 2-1) where it specifies that casual accommodation has a peak hour traffic generation rate of 0.4 vehicles per room and restaurants have a peak hour traffic generation rate of five (5) vehicles per 100m² of Gross Floor Area (GFA). It is assumed that these traffic generation rates are inclusive of generation of hotel / restaurant guest and staff. The hotel is expected to generate traffic in the morning and evening peak periods.

However, the restaurant / bar is expected to generate traffic in the evening peak hour only. The restaurant / bar traffic generation has been reduced by 30% to account for cross utilisation of the restaurant by hotel guests. Therefore, the 99-room hotel and 306m² restaurant/bar is expected to generate 40 vehicles in the morning peak hour and 50 vehicles in the evening peak hour. The directional split for hotel and restaurant/bar traffic is assumed to be as follows:

- Morning peak hour – 70% outbound : 30% inbound; and
- Evening peak hour – 30% outbound : 70% inbound.

4.1.4 Commercial Generation

Commercial traffic generation rates have been conservatively assumed in estimating the traffic generation of both the 474m² commercial tenancy and the 506m² research & education facility.

Traffic generation rates for the commercial component of the development were obtained from the TCC Breakwater report. This specifies the traffic generation rates for commercial developments of:

- One (1) vehicle per 100m² in the morning peak hour; and
- Five (5) vehicles per 100m² in the evening peak hour.

Commercial traffic generation has been reduced by 30% to account for cross utilisation of facilities, that is, some hotel guests or ferry / bus passengers visit or work at the commercial component of the development.

Therefore, for a Gross Floor Area of 980m² the commercial / research & education component of the development is expected to generate:

- Seven (7) vehicles in the morning peak hour; and
- 34 vehicles in the evening peak hour.

The directional split of traffic generated by the commercial / research & education component of the development has been obtained from the TCC Breakwater Report. The applicable directional splits are:

- Morning peak hour – 0% inbound : 100% outbound; and
- Evening peak hour – 40% inbound : 60% outbound.

4.1.5 Retail Generation

Traffic generation rates for the retail component of the development were obtained from the TCC Breakwater report where it specifies the rates for commercial developments which include retail. Therefore, the same traffic generation rates and directional splits determined for the Commercial component of the development will be used for the retail component of the development, refer Section 4.1.4.

As with the commercial component of the development, retail traffic generation has been reduced by 30% to account for cross utilisation of facilities.

Therefore, for a GFA of 682m² the retail component of the development is expected to generate:

- Five (5) vehicles in the morning peak hour; and
- 24 vehicles in the evening peak hour.

The directional split of traffic generated by the retail component of the development has been obtained from the TCC Breakwater Report for commercial developments, refer Section 4.1.4.

4.1.6 Total Generation

Table 4-1 summarises the total development traffic generation conservatively estimated in the preceding sections. The development is expected to generate a total of 464vph during the morning peak hour and 507vph during the evening peak hour.

Table 4-1: Total Development Traffic Generation

Development Component	Morning Peak Hour			Evening Peak Hour		
	Inbound	Outbound	Total	Inbound	Outbound	Total
Tourist buses / coaches	1vph	1vph	2vph	1vph	1vph	2vph
Local buses	6vph	6vph	12vph	6vph	6vph	12vph
School buses	7vph	7vph	14vph	0vph	0vph	0vph
Sub-total buses	14vph	14vph	28vph	7vph	7vph	14vph
Hotel and Restaurant/Bar	12vph	28vph	40vph	35vph	15vph	50vph
Ferry Terminal Parking	128vph	0vph	128vph	0vph	128vph	128vph
Ferry Terminal Kiss-and-Drop	128vph	128vph	256vph	128vph	128vph	256vph
Commercial / Research & Educational	0vph	7vph	7vph	14vph	21vph	35vph
Retail	0vph	5vph	5vph	10vph	14vph	24vph
Sub-total light vehicles	268vph	168vph	436vph	187vph	306vph	493vph
Total	282vph	182vph	464vph	194vph	313vph	507vph

Service vehicle activity generated by the development is not expected to be significant during commuter peak periods. However, SIDRA modelling (refer Section 5.3.2 and 5.4) conservatively assumes that heavy vehicles make up 5% of all development traffic generation (except bus hub generation which is 100% buses).

Light vehicle traffic generation rates are assumed to include trips by private car, taxi and ride share, e.g. Uber. No additional allowance has been made for mode choice beyond that implicit in the adopted traffic generation rates. Light vehicle traffic generation rates are assumed to include all user groups including staff, passengers, guests, etc..

4.2 Trip Distribution

All traffic travelling to / from the development site, Sir Leslie Thiess Drive and the eastern end of the Strand must use the Strand link between Sir Leslie Thiess Drive and King Street.

4.3 Development Traffic Volumes on the Network

Development traffic volumes have been determined based on:

- The Roadworks Layout Plans (refer Section 3.3 and Appendix D); and
- The development traffic generation and distribution derived in Sections 4.1 and 4.2 respectively.

The long and short haul bus hub is proposed to be located on the eastern / southbound side of the development site's Sir Leslie Thiess Drive frontage. The proposed routes for access to the bus hub are:

- Inbound: via the Strand and Sir Leslie Thiess Drive, making use of the existing SeaLink ferry terminal site as a turnaround area to get back onto Sir Leslie Thiess Drive southbound; and
- Outbound: via Sir Leslie Thiess Drive and the Strand.

In relation to the hotel and restaurant / bar development, it is assumed that:

- All inbound trips are to the porte cochere;
- Inbound and outbound trips at the porte cochere are equal; and
- The balance of trips are to / from the main car park.

This implies that:

- During the morning peak hour, 40% of hotel trips are outbound from the main car park with the balance of trips being by taxi, ride share (e.g. Uber) or drop-off / pick-up by family / friend; and
- During the evening peak hour, there are trips "internal" to the development from the porte cochere to the main car park. The volume of these internal trips (by private / hire car) are equivalent to 40% of the hotel and restaurant / bar's total peak hour generation with the balance of trips being by taxi, ride share (e.g. Uber) or drop-off / pick-up by family / friend in the porte cochere.

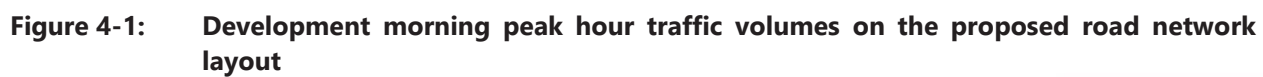
Table 4-2 summarises the traffic generated by the hotel and restaurant/bar for each peak hour.

Table 4-2: Hotel Traffic Generated

Source	Morning Peak Hour			Evening Peak Hour		
	Inbound	Outbound	Internal*	Inbound	Outbound	Internal*
Porte-Cochere	12vph	12vph	0vph	35vph	15vph	20vph
Car Park	0vph	16vph		0vph	0vph	
Total	12vph	28vph	0vph	35vph	15vph	20vph

*Traffic travelling from the Porte-Cochere to the car park.

Development traffic volumes are shown in Figure 4-1 for the morning peak hour and in Figure 4-2 for the evening peak hour. Traffic volumes with the letter 'B' next to them in the following figures represent bus volumes. Other figures are based on light vehicle generation rates but are assumed to comprise 95% light vehicles and 5% heavy vehicles.



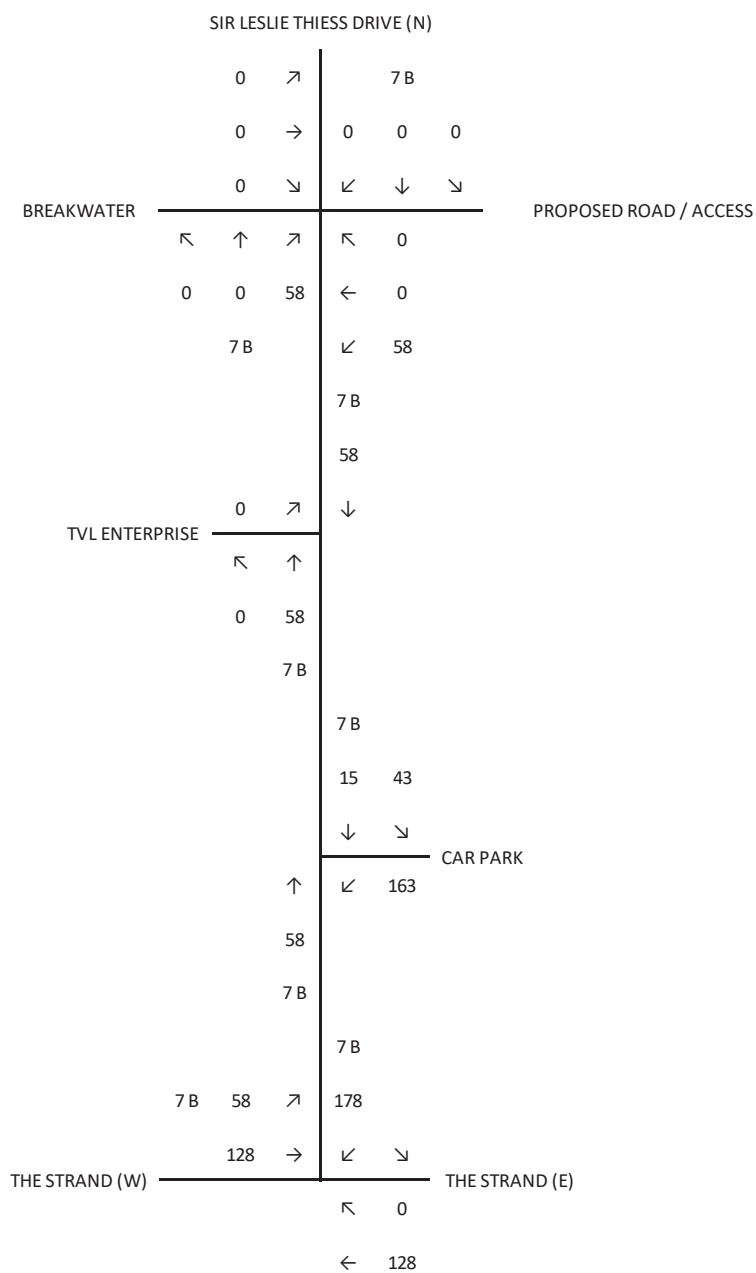


Figure 4-2: Development evening peak hour traffic volumes on the proposed road network layout

5 IMPACT ASSESSMENT AND MITIGATION

5.1 With and Without Development Traffic Volumes

Figure 5-1 and Figure 5-2 show the redistribution of existing traffic (refer Figure 2-6 and Figure 2-7) due to the proposed construction of a concrete median on Sir Leslie Thiess Drive passed the Enterprise House access.

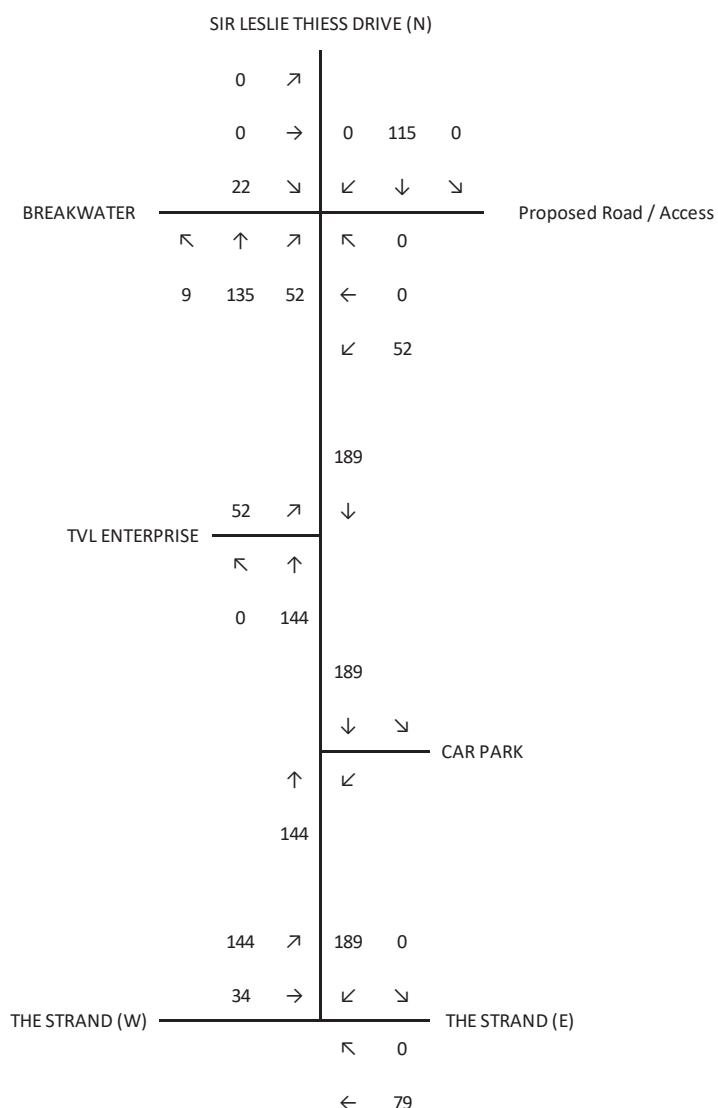


Figure 5-1: Without development morning peak hour traffic volumes on the proposed road network layout

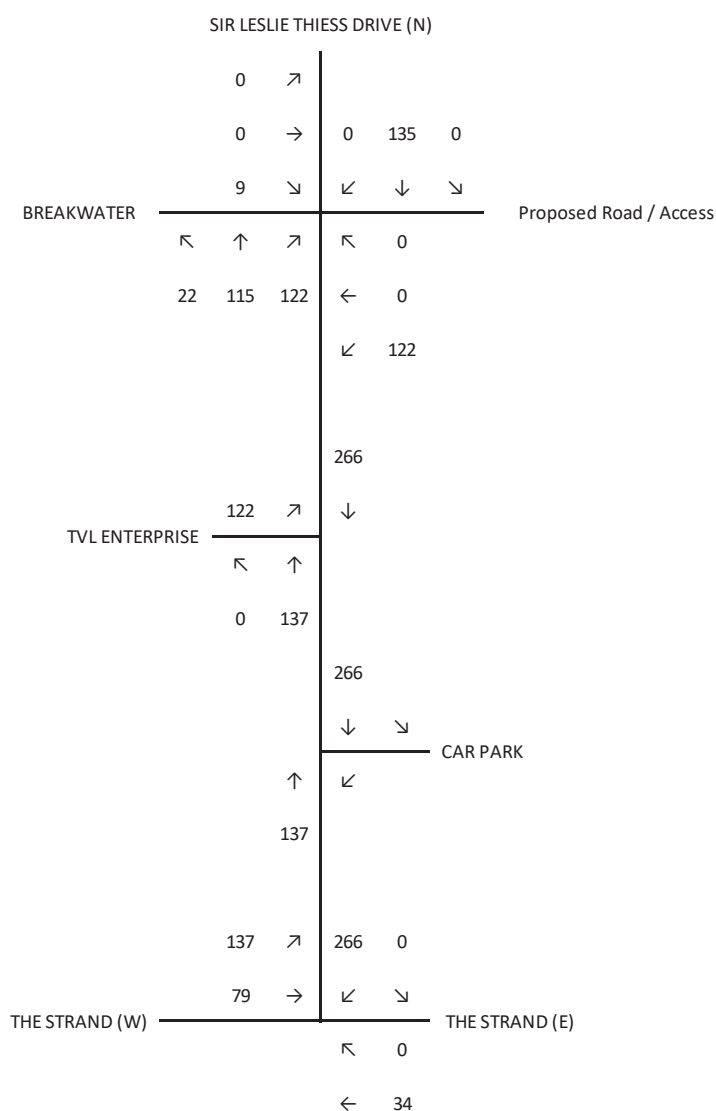


Figure 5-2: Without development evening peak hour traffic volumes on the proposed road network layout

With development traffic volumes were estimated by summing the without development traffic volumes shown by Figure 5-1 and Figure 5-2 with the corresponding development traffic volumes shown by Figure 4-1 and Figure 4-2. With development traffic volumes on the proposed road network layout are shown in Figure 5-3 for the morning peak hour and in Figure 5-4 for the evening peak hour. As in Figure 4-1 and Figure 4-2, traffic volumes with the letter 'B' next to them represent bus volumes other figures are assumed to comprise 95% light vehicles and 5% heavy vehicles for the purposes of SIDRA analysis.

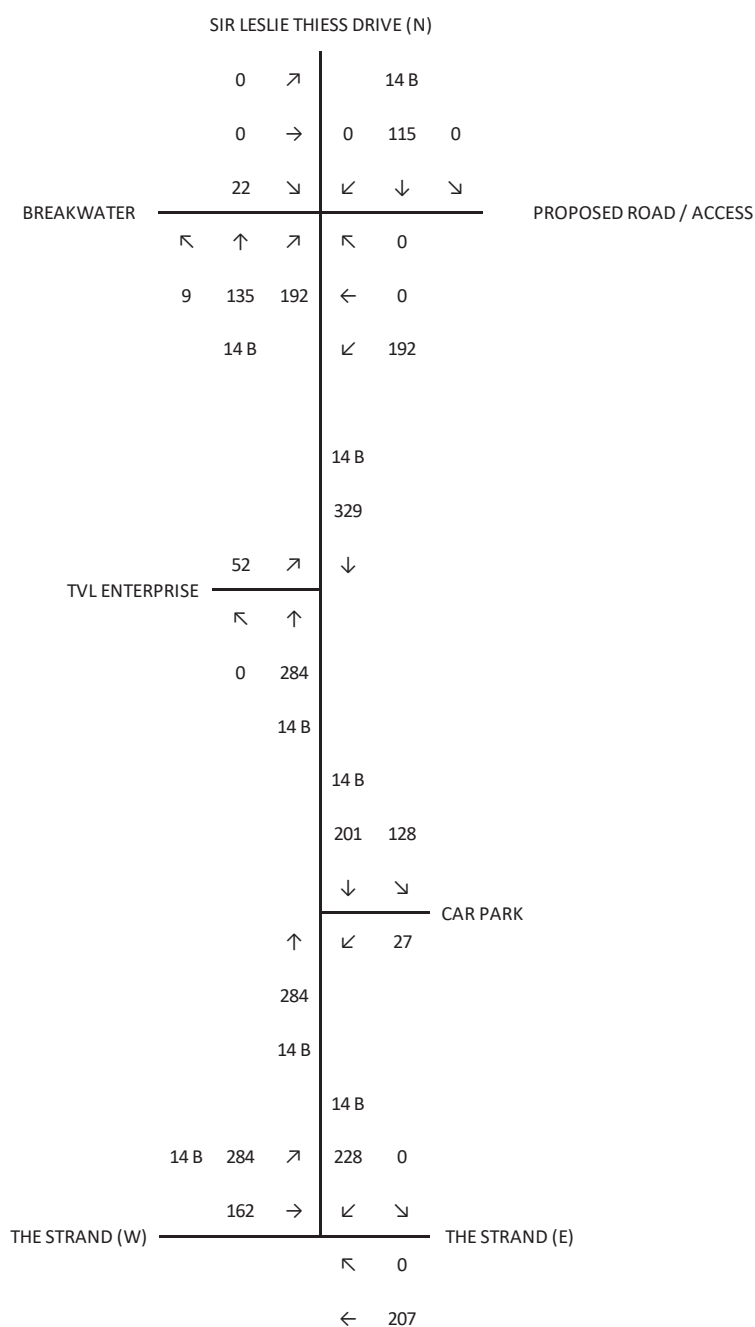


Figure 5-3: With development morning peak hour traffic volumes

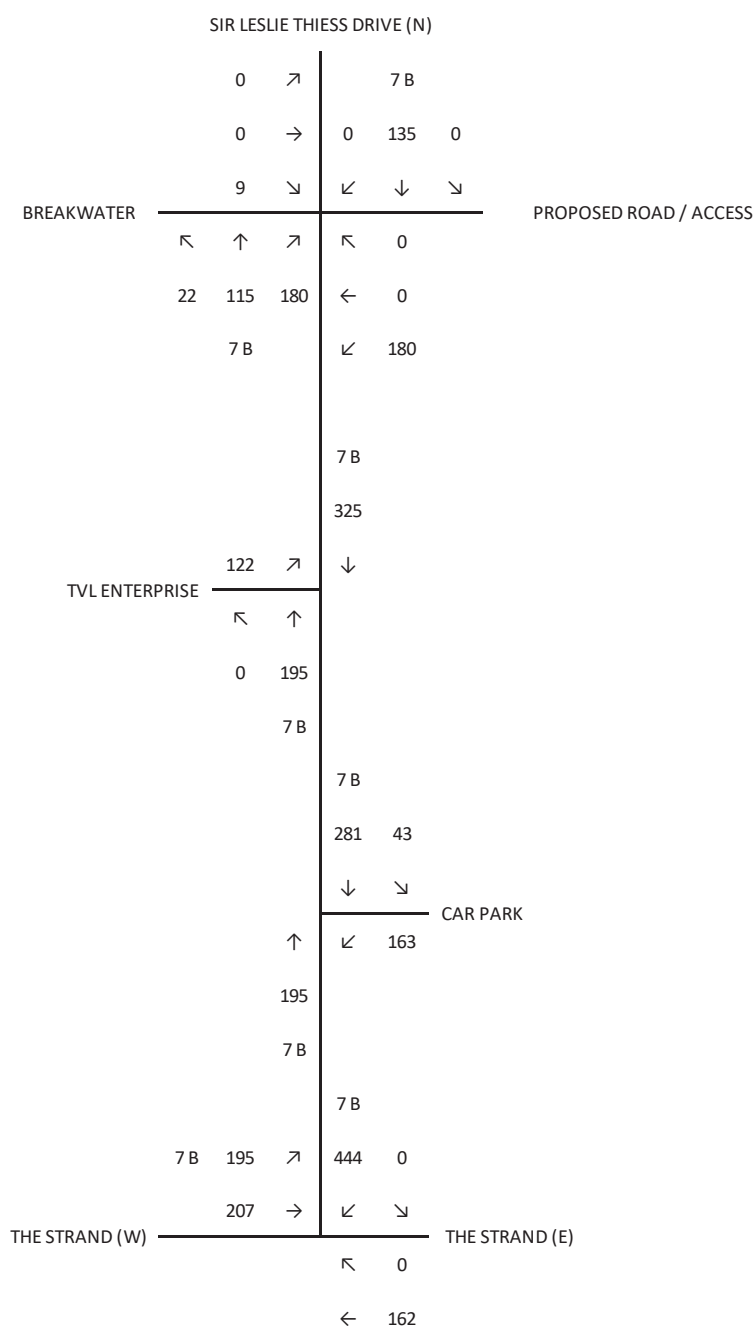


Figure 5-4: With development evening peak hour traffic volumes

5.2 Road Safety Impact Assessment and Mitigation

A Road Environment Safety Assessment was conducted in accordance with the GTIA to determine if the proposed roadworks should be subjected to a road safety audit by an accredited road safety auditor or a road safety assessment by either an accredited road safety auditor or a registered professional engineer of Queensland (RPEQ).

Based on with development traffic volumes shown by Figure 5-3 and Figure 5-4 the maximum two-way volume on Sir Leslie Thiess Drive is estimated to be 693vph. Assuming that peak hour traffic volumes on Sir Leslie Thiess Drive make up 10% of the daily traffic volumes. It is estimated that the Annual Average Daily Traffic (AADT) volume on Sir Leslie Thiess Drive will be less than 8,000vpd.

With a posted speed limit of 50km/h and an estimated AADT of less than 8,000vpd, the GTIA indicates that Sir Leslie Thiess Drive has a low road environment safety risk rating.

Therefore, in accordance with the GTIA, the proposed roadworks do not require a road safety audit but should be subject to a road safety assessment. The road safety assessment may be conducted by either an accredited road safety auditor or a registered professional engineer of Queensland (RPEQ).

5.3 Access Impact Assessment and Mitigation

5.3.1 Turn Warrant Assessment

A turn warrant assessment was conducted for the proposed access road and the left-in-left-out access to the car park based on warrants contained in the "Supplement to Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections" (Transport and Main Roads, August 2014).

The assessment assumes a design speed of 60km/h, being 10km/h above the posted speed limit, and estimated with development traffic volumes shown by Figure 5-3 and Figure 5-4. Figure 5-5 shows the major road turn treatment warrants for a design speed of 70km/h or less.

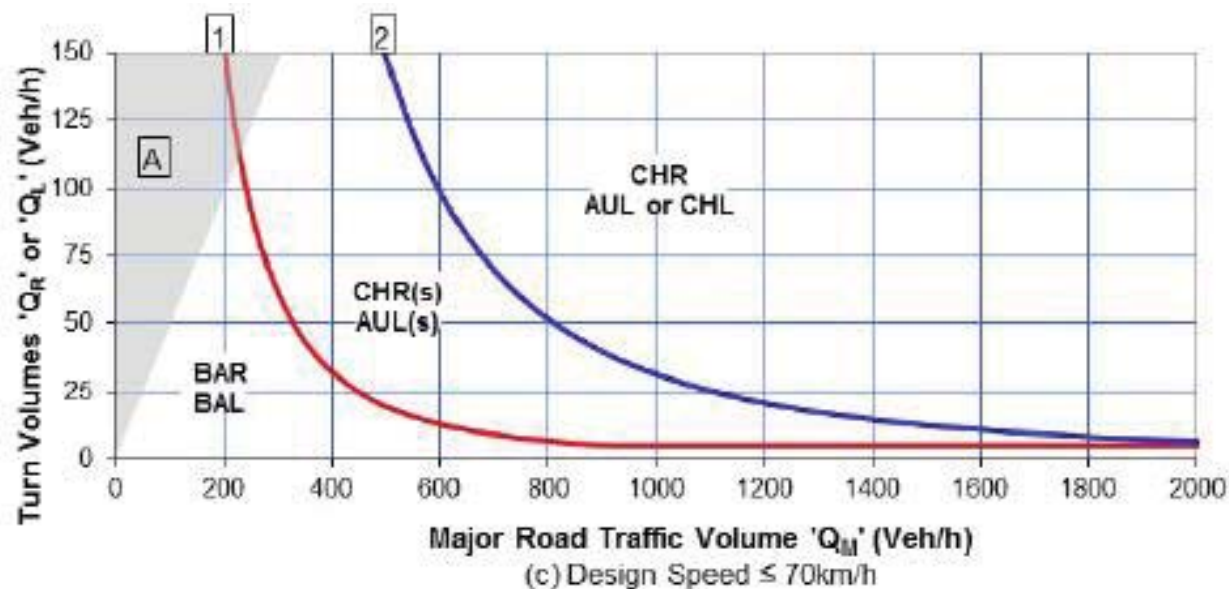


Figure 5-5: Major turn treatment warrants, normal design domain (Transport and Main Roads, August 2014)

The proposed road access intersection has a maximum right turn volume of 192vph and a major road volume of 279vph, it therefore warrants a channelised right turn treatment with a short turn lane (CHR(s)). The proposed access road intersection is expected to have very few, if any, left turning movements and therefore warrants a basic left (BAL) turn treatment. The new access intersection shown by the Roadworks Layout Plan is considered to comply with the turn treatment warrants.

The left-in left-out car park access has morning peak hour turn volumes of 128vph with a major road volume of 107vph in the kerbside lane and evening peak hour turn volume of 43vph with a major road volume of 144vph in the kerbside lane. Traffic volumes during both peaks warrant the provision of a basic left (BAL) turn treatment. The left-in-left-out car park access shown by the Roadworks Layout Plans complies with the turn treatment warrants.

5.3.2 Intersection Analysis

5.3.2.1 New Access Road Intersection

SIDRA was used to analyse the intersection of the proposed new access road with Sir Leslie Thiess Drive using the with development traffic volumes shown in Figure 5-3 and Figure 5-4. Appendix F shows the SIDRA output results for the intersection. Key outputs from the SIDRA model are:

- The maximum DoS is 0.171, which is well below practical capacity;
- The maximum average delay to any movement is 13.0sec, which is considered short; and
- Maximum queue lengths do not exceed one (1) vehicle.

Table 5-1: SIDRA Output – New Access Road Intersection

Movement	AM Peak				PM Peak			
	V	DoS	D	Q	V	DoS	D	Q
South Approach: Sir Leslie Thiess Drive								
Left	9veh	0.093	2.7sec	0.0veh	23veh	0.084	2.7sec	0.0veh
Through	157veh	0.093	0.0sec	0.0veh	128veh	0.084	0.0sec	0.0veh
Right	220veh	0.166	3.2sec	0.7veh	196veh	0.162	3.3sec	0.7veh
East Approach: New Access Road								
Left	220veh	0.171	4.2sec	0.7veh	189veh	0.161	4.3sec	0.6veh
Through	1veh	0.171	9.0sec	0.7veh	1veh	0.161	8.7sec	0.6veh
Right	1veh	0.171	10.8sec	0.7veh	1veh	0.161	10.2sec	0.6veh
North Approach: Sir Leslie Thiess Drive								
Left	1veh	0.039	5.5sec	0.0veh	1veh	0.041	5.5sec	0.0veh
Through	136veh	0.039	0.0sec	0.0veh	149veh	0.041	0.0sec	0.0veh
Right	1veh	0.039	6.0sec	0.0veh	1veh	0.041	5.9sec	0.0veh
West Approach: Breakwater Villas' Access								
Left	1veh	0.079	3.5sec	0.3veh	1veh	0.031	3.4sec	0.1veh
Through	1veh	0.079	7.0sec	0.3veh	1veh	0.031	6.6sec	0.1veh
Right	23veh	0.079	13.0sec	0.3veh	9veh	0.031	11.4sec	0.1veh

5.3.2.2 Left-in-Left-out Car Park Access

SIDRA was used to analyse the proposed left-in-left-out car park access on Sir Leslie Thiess Drive using the with development traffic volumes shown in Figure 5-3 and Figure 5-4. Appendix G shows the SIDRA output results for the access. Key outputs from the SIDRA model are:

- The maximum DoS is 0.120, which is well below practical capacity;
- The maximum average delay to any movement is 5.1sec, which is considered very short; and
- Maximum queue lengths do not exceed one (1) vehicle.

Table 5-2: SIDRA Output – Left-in Left-out Access

Movement	AM Peak				PM Peak			
	V	DoS	D	Q	V	DoS	D	Q
East Approach: Development Access								
Left	28veh	0.018	3.0sec	0.1veh	172veh	0.120	3.3sec	0.5veh
North Approach: Sir Leslie Thiess Drive								
Left	135veh	0.100	5.1sec	0.0veh	45veh	0.094	5.1sec	0.0veh
Through	226veh	0.105	0.0sec	0.0veh	303veh	0.094	0.0sec	0.0veh

5.3.3 Sight Distances

The GTIA specifies minimum sight distance requirements to be:

- Approach Sight Distance (ASD) required to the road surface at all intersections and accesses;
- Safe Intersection Sight Distance (SISD) desirable between a vehicle using a public road intersection and a vehicle approaching on the major road; and
- Minimum Gap Sight Distance (MGSD) acceptable between a vehicle using a public road intersection and a vehicle approaching on the major road.

ASD, SISD and MGSD are defined in the "Guide to Road Design Part 4A: Unsignalised and Signalised Intersections" (Austroads 2017). Austroads also provides formulae for calculating the acceptable minimum sight distances for the normal design domain (NDD).

ASD is the distance at which a driver can see any line marking on the road surface at the intersection or the change in kerb alignment at an access. ASD should be sufficient to allow a driver to react to the intersection / access and, if necessary, come to a complete stop before entering the intersection. Minimum ASD is calculated using the formula

$$ASD = \frac{R_T \times V}{3.6} + \frac{V^2}{254 \times (d + 0.01 \times a)}$$

where

- R_T = reaction time
= 1.5sec alert driving conditions (high expectancy of stopping);
- V = design speed;
- d = coefficient of acceleration
= 0.36 (desirable value for most urban and rural road types); and
- a = longitudinal grade.

SISD is the distance at which a driver can see a vehicle moving into a collision situation and decelerate to a stop before reaching the collision point. Minimum SISD is calculated using the formula

$$SISD = \frac{D_T \times V}{3.6} + \frac{V^2}{254 \times (d + 0.01 \times a)}$$

where the meaning of variables is as for ASD with decision time, D_T , being the sum of reaction time, R_T , and observation time, O_T (3.0 sec).

MGSD is based on distances corresponding to the critical acceptance gap that drivers are prepared to accept when undertaking a crossing or turning manoeuvre at intersections. MGSD is measured from the point of conflict between approaching and entering vehicles back along the centre of the travel lane of the approaching vehicle. The MGSD is dependent on the critical gap acceptance time (t_a) that a driver of an entering vehicle accepts to see a vehicle in the conflicting streams to safely commence the desired manoeuvre. The critical gap acceptance in this case is 5.0sec for cars.

The minimum sight distance requirements for vehicles travelling at 60km/h, being 10km/h above the posted speed limit, on a level grade are:

- ASD – 64m;
- SISD – 114m; and
- MGSD – 83m.

Figure 5-6 shows sight distance to the North of the proposed access road intersection. Available sight distance is estimated at over 80 metres and is considered to comply with minimum requirements for ASD and MGSD. Figure 5-7 shows sight distance to the South of the proposed access road intersection. Available sight distance is estimated at approximately 150m which complies with minimum requirements for ASD and SISD. Therefore, in accordance with the GTIA, it is concluded that sight distances at the proposed new access road intersection are acceptable.

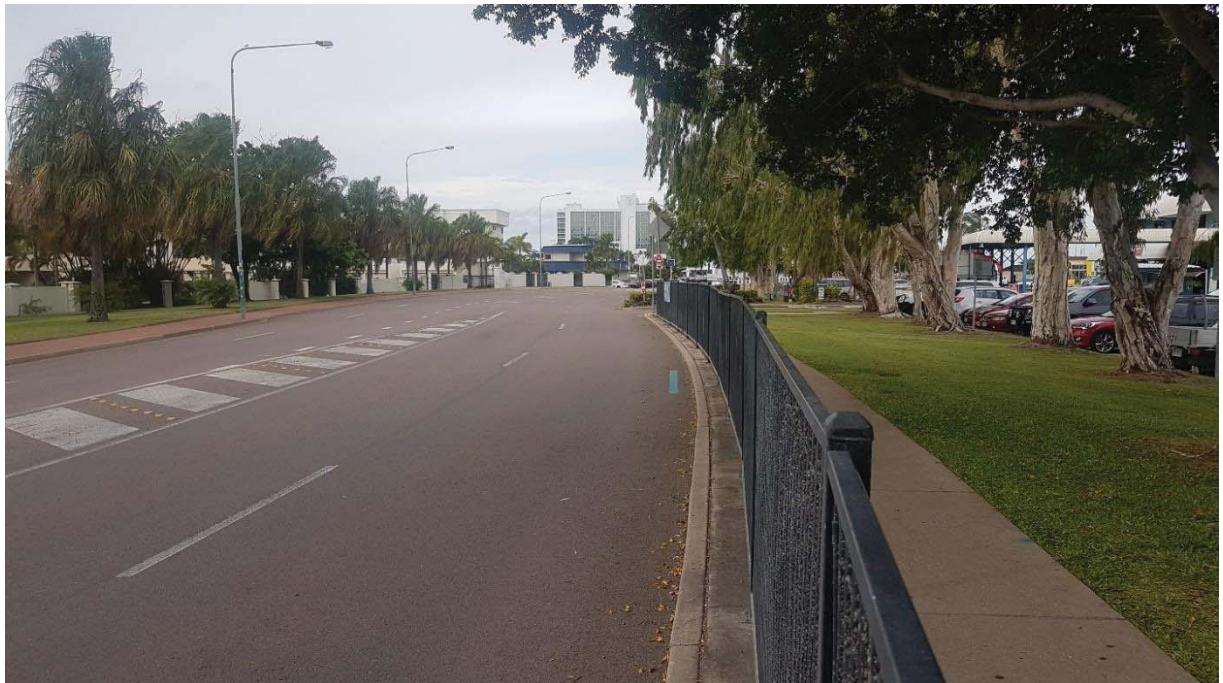


Figure 5-6: Sir Leslie Thiess Drive looking North of the proposed priority intersection



Figure 5-7: Sir Leslie Thiess Drive looking South from the proposed priority intersection

Figure 5-8 shows sight distance to the North of the proposed left-in-left-out car park access. The left-in-left-out car park access is to be located approximately 80m South of the proposed new access road intersection which complies with minimum requirements for ASD which is all that is required by the GTIA for a property access.



Figure 5-8: Sir Leslie Thiess Drive looking North from the proposed left-in left-out access

Figure 5-9 shows sight distance to the South of the proposed left-in-left-out car park access. The left-in-left-out car park access is to be located approximately 70m North of the Strand. Which complies with minimum requirements for ASD. Conservatively assuming that a vehicle exiting the proposed car park is travelling at the posted speed limit of 50km/h from the moment it enters Sir Leslie Thiess Drive, it will take five (5) seconds to reach the Strand. Considering that vehicles will not be travelling at 50km/h when exiting the car park the separation between the left-in-left-out car park access and the Strand is considered to comply with minimum requirements for MGSD. Therefore, in accordance with the GTIA it is concluded that the proposed location of the left-in-left-out car park access provides adequate separation from the Strand to maintain acceptable sight distances at the Strand / Sir Leslie Thiess Drive intersection.



Figure 5-9: Sir Leslie Thiess Drive looking South from the proposed left-in left-out access

5.4 Intersection Capacity Assessment

5.4.1 The Strand / Sir Leslie Thiess Drive

SIDRA was used to analyse The Strand / Sir Leslie Thiess Drive intersection using the with development traffic volumes shown in Figure 5-3 and Figure 5-4. Appendix H shows the SIDRA Output results for The Strand / Sir Leslie Thiess Drive Intersection. Key output results from the SIDRA model are:

- Maximum DoS is 0.251, which is well below practical capacity;
- The maximum average delay to any movement is 8.0sec, which is considered very short; and
- Maximum queue lengths do not exceed more than one (1) vehicle.

Table 5-3: SIDRA Output – The Strand / Sir Leslie Thiess Drive Intersection, With Development

Movement	AM Peak				PM Peak			
	V	DoS	D	Q	V	DoS	D	Q
East Approach: The Strand								
Through	218veh	0.093	4.5sec	0.3veh	171veh	0.090	5.5sec	0.3veh
Right	1veh	0.001	6.4sec	0.0veh	1veh	0.002	8.0sec	0.0veh
North Approach: Sir Leslie Thiess Drive								
Left	1veh	0.074	4.7sec	0.0veh	1veh	0.134	4.7sec	0.0veh
Right	255veh	0.074	4.7sec	0.0veh	475veh	0.134	4.7sec	0.0veh
West Approach: The Strand								
Left	314veh	0.201	5.7sec	1.0veh	213veh	0.136	5.7sec	0.6veh
Through	171veh	0.162	5.9sec	0.6veh	218veh	0.251	7.2sec	1.0veh

Referring to Section 2.5.1 showing the SIDRA results for the Strand / Sir Leslie Thiess Drive intersection based on existing traffic volumes, the development traffic is expected to increase the maximum average delay by less than two (2) seconds which is not expected to be noticed by road users and is not expected to increase queue lengths.

5.4.2 Flow Scale Analysis

As a result of the closed Sir Leslie Thiess Drive catchment, future traffic growth in the area will be driven by new developments. Despite the numerous development proposals referred to in the TCC Breakwater Report, there have been no major developments in the catchment in more than 10 years making it impossible to determine a background growth rate for use in design life analysis. Therefore, flow scale analysis has been used to determine the capacity available in the study area road network to accommodate future development. For this assessment, through traffic on Sir Leslie Thiess Drive (including the turning movements to and from the western leg of the Strand intersection) were increased in increments of 3%. Both the practical capacity and worst level of service target analysis objectives were used to determine the lowest flow scale.

Flow scale analysis was carried out for all three (3) intersections in the study area, relevant SIDRA output results are attached in Appendix I. The critical intersection was found to be the new access road intersection with a flow scale of 241%, that is, with development traffic volumes could increase by a factor of more than two (2) before either the study area road network reached its practical capacity or delays at any intersection reach an unacceptable level.

5.5 Other Impacts Assessment

5.5.1 Public Transport

The bus stop geometry shown by the Roadworks Layout plan attached in Appendix D is generally in accordance with the Townsville City Planning Scheme SC6.4.4.8.5. For further information on bus stop geometry refer to documentation prepared by STP Consultants in relation to the Roadworks Layout Plans.

The proposed bus stop is expected to be free flowing with through traffic in the kerbside lane of Sir Leslie Thiess Drive legally required to give way to buses leaving a bus stop.

5.5.2 Pathways

The Sir Leslie Thiess Drive verge adjacent to the subject site will be paved to improve pedestrian connectivity and amenity for public transport passengers.

To discourage pedestrians crossing Sir Leslie Thiess Drive through the right turn lane into the proposed new access road the existing pedestrian refuge on Sir Leslie Thiess Drive will be relocated north of the new access road intersection as shown by Roadworks Layout Plans.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary of Impacts and Mitigation Measures

Based on the preceding discussion and analysis the following conclusions are drawn.

6.1.1 Traffic Volumes

The development is conservatively expected to generate:

- 464vph during the morning peak hour;
- 507vph during the evening peak hour; and
- Approximately 50 bus movements per day.

6.1.2 Road Safety

Proposed changes to the road environment on Sir Leslie Thiess Drive will not require a road safety audit but should be subject to a road safety assessment. A road safety assessment may be conducted by either an accredited road safety auditor or a registered professional engineer of Queensland (RPEQ).

6.1.3 Access

Site access arrangements shown by the Roadworks Layout Plans attached in Appendix D comply with turn warrant assessments in accordance with the "Supplement to Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections" (Transport and Main Roads, August 2014).

Intersection analysis was conducted with SIDRA which determined that both the proposed access road / Sir Leslie Thiess Drive intersection and the left-in-left-out car park access on Sir Leslie Thiess Drive are expected to operate well below their practical capacities, with short delays and very short queues.

The proposed location of access intersections provides acceptable sight distance and maintain acceptable sight distance at the Strand / Sir Leslie Thiess Drive intersection.

6.1.4 Intersection Capacity Analysis

Flow scale analysis was carried out for all three (3) intersections in the study area. The critical intersection was found to be the new access road intersection with a flow scale of 241%, that is, with development traffic volumes could increase by a factor of more than two (2) before either the study area road network reaches its practical capacity or delays at any intersection reach an unacceptable level.

6.1.5 Other Impacts

The bus stop geometry shown by the Roadworks Layout Plans attached in Appendix D is generally in accordance with the Townsville City Planning Scheme SC6.4.4.8.5 for transport.

Proposed changes to pedestrian facilities on Sir Leslie Thiess Drive as shown by the Roadworks Layout Plans attached in Appendix D will improve connectivity and amenity as well as reducing conflict between pedestrians and vehicles at the proposed new access road intersection.

6.2 Certification Statement and Authorisation

This report was prepared by Daniel Marais under the direct supervision of Bradley Jones (RPEQ 19986).

Traffic Impact Assessment Certification in accordance with the GTIA is attached in Appendix J.

APPENDIX A
EDQ EMAIL

Daniel Marais

From: Sarah Jones <sjones@milfordplanning.com.au>
Sent: Thursday, 31 January 2019 8:17 AM
To: Daniel Marais
Cc: Bradley Jones; Blair Shillington
Subject: M1399 - Townsville Marine Tourism Precinct - feedback on scope for DA technical reports

FYI

From: Anne Edmonds <Anne.Edmonds@dsdmip.qld.gov.au>
Date: Friday, 21 December 2018 at 4:22 pm
To: "Sarah Jones (sjones@milfordplanning.com.au)" <sjones@milfordplanning.com.au>, "gmilford@milfordplanning.com.au" <gmilford@milfordplanning.com.au>
Cc: Rachael Grimes <Rachael.Grimes@dsdmip.qld.gov.au>
Subject: Townsville Marine Tourism Precinct - feedback on scope for DA technical reports

Hi Sarah and George,

As discussed in our meeting yesterday, please see the below suggested scope for reporting for the proposed development of the Townsville Marine Tourism Precinct. Since we spoke Townsville City Council has provided me with written requests for inclusion within the recommended scope. As discussed, it is recommended that a holistic transport infrastructure assessment be carried out for the development that encompasses all forms of transport that will engage with the proposal. This assessment may take the form of a single TIA report or several reports that reference and inform each other.

RECOMMENDED SCOPE FOR REPORTING

Transport Infrastructure assessment

It is noted that in accordance with the Townsville City Waterfront (TCW) Priority Development Area (PDA) Development Scheme, the PDA-wide criteria *3.5.4 Street and Movement Network*, section e., refers to the submission of a TIA prepared with reference to the Townsville City Council Planning Scheme SC6.4 Development Manual Planning Scheme Policy. It is recommended that the TIA clearly demonstrate how the proposed development is consistent with the traffic and transport provisions for the PDA, and the broader road network under the TCC Planning Scheme.

Generally:

It is recommended that the TIA:

- evaluate the worst case traffic scenario having regard to the number of different uses on the site and consideration to likely fluctuation in peak activity.
- should be prepared and certified by a suitably qualified RPEQ.
- should clearly document the approach, methodology and assumptions utilised for the analysis. It is recommended that any application of assumptions be clearly articulated, particularly for trip distribution across the various modes and assignment. The TIA should also clearly summarise the results of the Level of Service (LOS) calculations and include figures depicting the modelled traffic volumes for the proposal.
- should detail any proposed mitigation measures and provide worksheet and analysis input/output data (within appendices) where appropriate.
- should generally align with the requirements specified for a Moderate/High TIA as described within SC6.4.3.14.3(3) of the TCC Planning Scheme.

- scope background assumptions with regard to existing approved developments within the area, and rationalise where appropriate.
- results from the Traffic Analysis performance criteria analysis be compared using the Measure of Effectiveness (MOE), as set out in Table SC6.4.3.14.4 of the TCC Planning Scheme
- consider the following multi-modal transport typologies as a component of the development and consider the connectivity of the site to the existing footpath and cycling network:
 - Standard car
 - Trucks and service vehicles (waste collection, delivery etc)
 - Public transport buses, coach / long haul buses and shuttle buses
 - Taxi and ride-sharing services (Uber)
 - Pedestrians
 - Cyclists (regard to both commuter and recreational use)
 - Emergency service vehicle (ambulance, police, fire services)
 - Access for people with disability

Public Passenger Transport Standards:

- The TIA or another alternative report should address the TransLink standards as per the SPP guidance material for Public Passenger Transport facilities and the TransLink Public Transport Infrastructure Manual (PTIM). It is noted that the TCW PDA Development Scheme PDA-wide criteria 3.5.4 *Street and Movement network, Section f*, refers to development reinforcing the provision of public transport and integration of transport routes in accordance with appropriate standards.
 - <https://dsdmipprd.blob.core.windows.net/general/spp-guidance-transport-infrastructure-july-2017.pdf>
 - <https://publications.qld.gov.au/dataset/public-transport-infrastructure-manual>
- Integration of active transport and mode share through the site and the interaction between the bus interchange and the ferry landings / docking locations (these provisions are included within the PTIM)
- Proposed bus manoeuvring to the site should be clearly articulated.
- Consideration should be given to the potential for site queuing/interaction of queuing with proposed bus interchange/depot area. Details surrounding the frequency and anticipated number of bus versus vehicle movements per hour/time period is recommended.
- It is recommended that the demand analysis for anticipated mode share for users of the facility include an analysis of the active transport / car / commuter / school and resulting desire lines - anticipated and designed

General comments regarding additional anticipated reports:

Sensitive uses assessments

- Acoustic report – Analysis of the impact of proposed use and operations on nearby sensitive uses, the proposed acoustic treatments to maintain suitable levels from outside acoustic impacts (ie. Port operations) on the proposed sensitive use (short term accommodation)
- Lighting assessment - to address the requirements outlined within the PTIM surrounding safe and well lit transport infrastructure while also maintaining compliance with MSQ requirements for the navigable channel and control of intrusive lighting.
- Odour and airborne contaminants (dust) - to assess and address impacts from the port operations
- Visual impact – assessment/addressing the management of the degree and potential of overlooking proposed from the hotel to the port operations. It is noted that the draft port masterplan seeks management and minimisation of visual impact on or from the port operations and port infrastructure.

Stormwater Management Plan

- Address quality and quantity arrangements for the site

Design intent statement

- Information regarding the architectural and urban design intent that informed the development proposal

- This statement could include:
 - built form design to respond to anticipated desire lines
 - responsiveness of the development to a potential future realignment of Sir Leslie Thiess Drive
 - discussion and analysis regarding the proposed setbacks
 - car park design, presentation and screening
 - climatic responsive design features

Civil infrastructure

- Water and sewer assessment including any proposed upgrades
- Telecommunications
- Infrastructure charges/credits for existing uses (details including existing GFA may assist in accurately calculating credits)

Other comments – Townsville City Council (TCC)

- TCC has advised they are able to provide a 7 day Tube Counter Survey on Sir Leslie Thiess Drive north of the existing ferry terminal site near the boat ramp access point for the period 14 April 2016 to 20 April 2016. It is noted that this survey is more than 2 years old, and it is recommended that the TIA obtains new traffic counts.
- Traffic forecasting and analysis: Council is in the process of updating the Townsville Aimsun Integrated Model (TAIM) to account for anticipated development proposed within the TCWPDA. The TAIM provides council a tool to estimate traffic growth projections on the network in line with the Townsville Growth Model and future demographic data in 5 year intervals up to 2036. It is recommended that the traffic forecasting and analysis undertaken by the Transport consultant have regard to the TAIM traffic projection timeframes of 2021, 2026, 2031 and 2036. TCC can provide traffic projections on Sir Leslie Thiess Drive for these time periods.
- In the instance that a roundabout is proposed within the road reserve adjoining the site, any intersection analysis of The Strand / Sir Leslie Thiess Drive should demonstrate delays in accordance with TCC Planning Scheme Table SC6.4.3.14.6 up to a ten year horizon following completion of development.
- Parking and on-site manoeuvrability and access should be assessed in accordance with AS2890 Parking Facilities, AS1428 Design for Access and Mobility and the PTIM where appropriate.
- There is initial concern surrounding the location of an indicated pedestrian crossing at the intersection of Sir Leslie Thiess Drive and the The Strand due to safety concerns.
- It is noted that there is a potential conflict between the proposed left in/ left out access from the site for exiting vehicle sightlines, should any bus be standing within the proposed bus pick up / drop off area.

As discussed, Rachael will be on leave returning to work on Monday 7 January, and I will be returning to work on Wednesday 2 January should any questions arise.

Kind Regards,
Anne

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APPENDIX B
SIDRA OUTPUT – EXISTING CONDITIONS THE STRAND / SIR
LESLIE THIESS DRIVE

SITE LAYOUT

▽ Site: 102 [Existing AM T-Int Strand/SLTD]

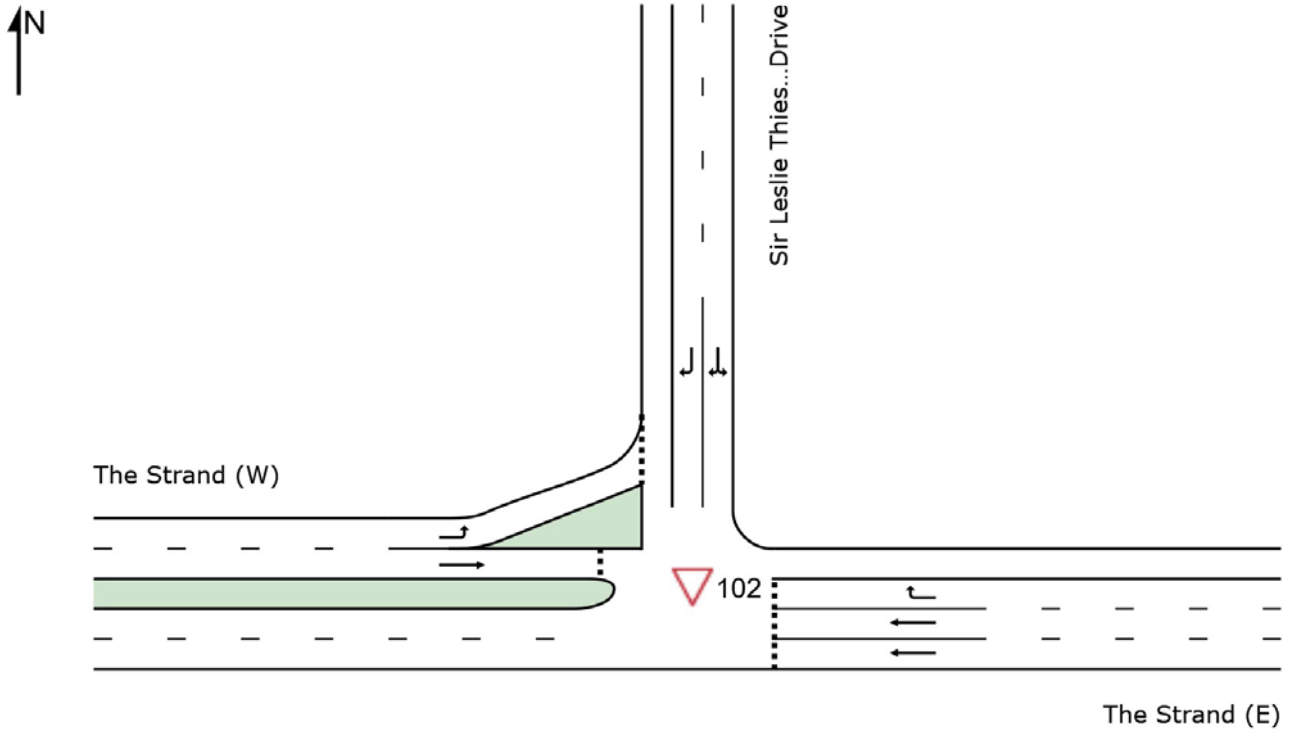
Existing

T-Intersection - The Strand / Sir Leslie Thiess Drive

With estimated existing Morning Peak Hour Traffic Volumes

Site Category: (None)

Giveaway / Yield (Two-Way)



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Organisation: PREMISE GROUP SERVICES PTY LTD | Created: Thursday, 31 January 2019 3:54:06 PM

Project: U:\Job Data\HON\0031\Engineering Design\Traffic\SIDRA\HON-00031 R01.sip8

MOVEMENT SUMMARY

▽ Site: 102 [Existing AM T-Int Strand/SLTD]

Existing

T-Intersection - The Strand / Sir Leslie Thiess Drive

With estimated existing Morning Peak Hour Traffic Volumes

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: The Strand (E)												
5	T1	83	5.0	0.034	4.2	LOS A	0.1	0.9	0.27	0.51	0.27	51.1
6	R2	1	5.0	0.001	5.6	LOS A	0.0	0.0	0.29	0.53	0.29	36.8
Approach		84	5.0	0.034	4.2	LOS A	0.1	0.9	0.27	0.51	0.27	51.0
North: Sir Leslie Thiess Drive												
7	L2	1	5.0	0.056	4.7	LOS A	0.0	0.0	0.00	0.57	0.00	33.2
9	R2	199	5.0	0.056	4.7	LOS A	0.0	0.0	0.00	0.57	0.00	50.0
Approach		200	5.0	0.056	4.7	NA	0.0	0.0	0.00	0.57	0.00	50.0
West: The Strand (W)												
10	L2	152	5.0	0.095	5.7	LOS A	0.4	3.0	0.01	0.54	0.01	51.1
11	T1	36	5.0	0.030	5.2	LOS A	0.1	0.8	0.30	0.53	0.30	49.1
Approach		187	5.0	0.095	5.6	LOS A	0.4	3.0	0.07	0.54	0.07	50.7
All Vehicles		472	5.0	0.095	5.0	NA	0.4	3.0	0.08	0.55	0.08	50.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 102 [Existing PM T-Int Strand/SLTD]

Existing

T-Intersection - The Strand / Sir Leslie Thiess Drive

With estimated existing Evening Peak Hour Traffic Volumes

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: The Strand (E)												
5	T1	36	5.0	0.016	4.5	LOS A	0.1	0.4	0.32	0.52	0.32	50.9
6	R2	1	5.0	0.001	6.2	LOS A	0.0	0.0	0.37	0.55	0.37	36.0
Approach		37	5.0	0.016	4.5	LOS A	0.1	0.4	0.32	0.52	0.32	50.6
North: Sir Leslie Thiess Drive												
7	L2	1	5.0	0.078	4.7	LOS A	0.0	0.0	0.00	0.57	0.00	33.2
9	R2	280	5.0	0.078	4.7	LOS A	0.0	0.0	0.00	0.57	0.00	50.0
Approach		281	5.0	0.078	4.7	NA	0.0	0.0	0.00	0.57	0.00	50.0
West: The Strand (W)												
10	L2	144	5.0	0.090	5.7	LOS A	0.4	2.8	0.01	0.54	0.01	51.1
11	T1	83	5.0	0.074	5.5	LOS A	0.3	2.0	0.35	0.57	0.35	48.9
Approach		227	5.0	0.090	5.6	LOS A	0.4	2.8	0.14	0.55	0.14	50.3
All Vehicles		545	5.0	0.090	5.1	NA	0.4	2.8	0.08	0.56	0.08	50.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

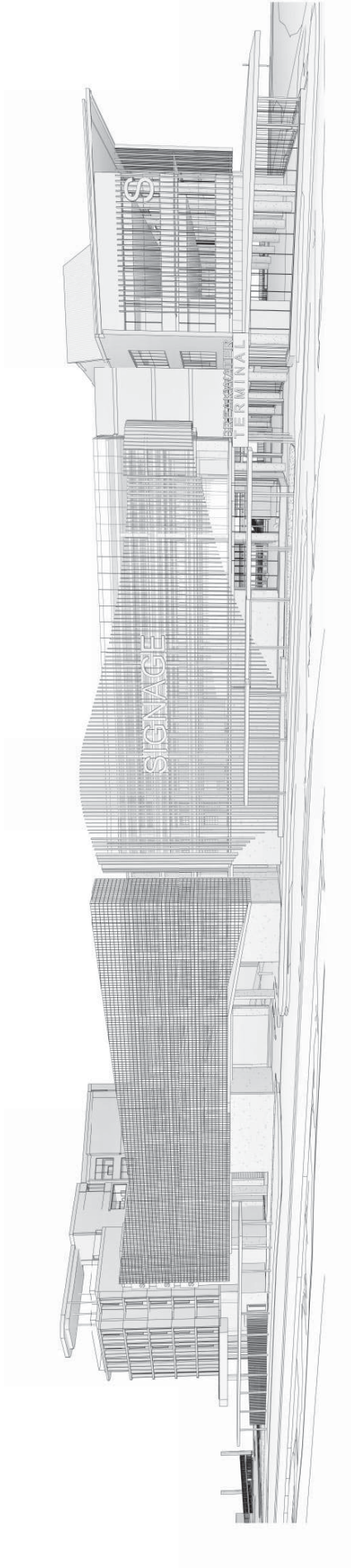
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

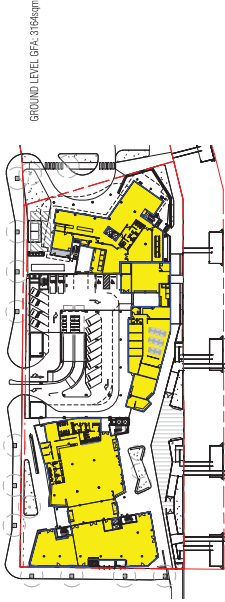
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX C
DEVELOPMENT SITE PLAN

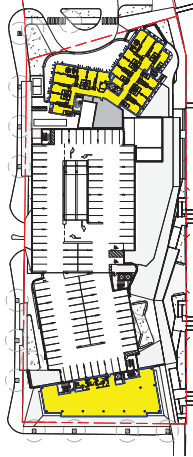
DEVELOPMENT APPLICATION
TOWNSVILLE MARINE TOURISM
PRECINCT

DRAWING LIST		
Sheet Number	Sheet Name	Current Revision
DAD00	CORR PAGE	A
DAD01	PROPOSED LAND AND PROPOSED PROPERTY	A
DAD02	AREA DIAGRAMS - DEVELOPMENT SUMMARY	A
DAD03	SITE PLAN	A
DAD04	GROUND LEVEL	A
DAD05	LEVEL 01	A
DAD06	LEVEL 02	A
DAD07	LEVEL 03	A
DAD08	LEVEL 04	A
DAD09	LEVEL 05	A
DAD10	LEVEL 06	A
DAD11	LEVEL 07	A
DAD12	ROOF - HOTEL	A
DAD13	ELEVATION SHEET 1	A
DAD14	ELEVATION SHEET 2	A
DAD15	DETAIL ELEVATIONS - SHEET 1	A
DAD16	DETAIL ELEVATIONS - SHEET 2	A
DAD17	DETAIL ELEVATIONS - SHEET 3	A
DAD18	DETAIL ELEVATIONS - SHEET 4	A
DAD19	DETAIL ELEVATIONS - SHEET 5	A
DAD20	DETAIL ELEVATIONS - SHEET 6	A
DAD21	HOTEL ROOM TYPICAL LAYOUT - SHEET 1	A
DAD22	HOTEL ROOM TYPICAL LAYOUT - SHEET 2	A
DAD23	HOTEL SUITE TYPICAL LAYOUT - SHEET 1	A
DAD24	HOTEL SUITE TYPICAL LAYOUT - SHEET 2	A
DAD25	ROOFING - SHEET 1	A
DAD26	ROOFING - SHEET 2	A
DAD27	ROOFING - SHEET 3	A
DAD28	ROOFING - SHEET 4	A
DAD29	ROOFING - SHEET 5	A
DAD30	ROOFING - SHEET 6	A
DAD31	ROOFING - SHEET 7	A
DAD32	ROOFING - SHEET 8	A
DAD33	ROOFING - SHEET 9	A
DAD34	ROOFING - SHEET 10	A
DAD35	ROOFING - SHEET 11	A
DAD36	ROOFING - SHEET 12	A
DAD37	ROOFING - SHEET 13	A
DAD38	ROOFING - SHEET 14	A
DAD39	ROOFING - SHEET 15	A
DAD40	ROOFING - SHEET 16	A
DAD41	ROOFING - SHEET 17	A
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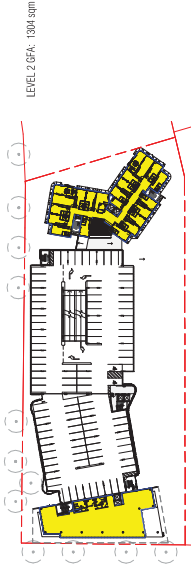




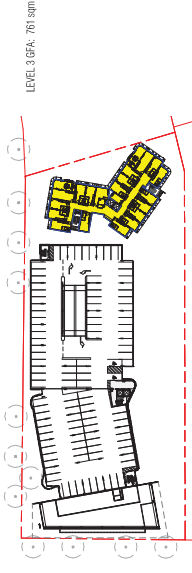
② GFA - GROUND LEVEL PLAN
SCALE 1:1000



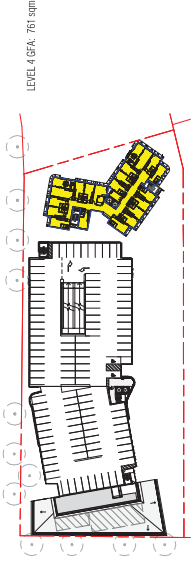
③ GFA - LEVEL 1 PLAN
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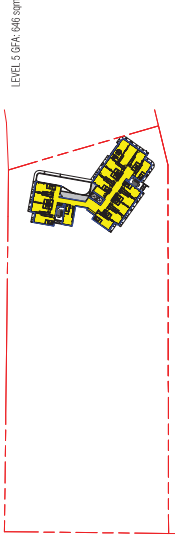
④ GFA - LEVEL 2 PLAN
SCALE 1:1000



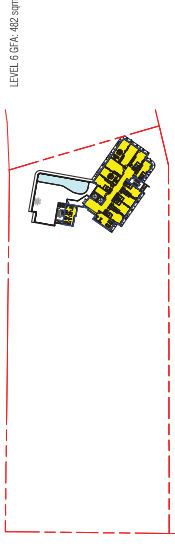
⑤ GFA - LEVEL 3 PLAN
SCALE 1:1000



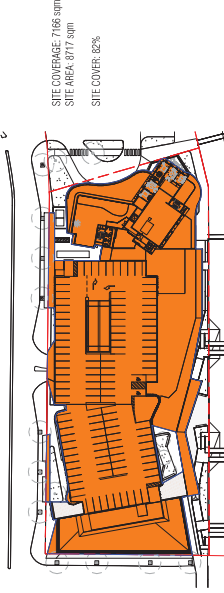
⑥ GFA - LEVEL 4 PLAN
SCALE 1:1000



⑦ GFA - LEVEL 5 PLAN
SCALE 1:1000



⑧ GFA - LEVEL 6 PLAN - HOTEL
SCALE 1:1000



⑨ SITE COVERAGE DIAGRAM
SCALE 1:1000

DEVELOPMENT SUMMARY

Site Area: 8717m² (Land Lease)
2607m² (Water Lease)
1565m² (POTL Road Access)

RPD: Lot 363 on EP776
Lot 738 on EP1235
Lot 705 on EP2163
Lot 433 on EP121
Lot 613 on EP1805
Lot 704 on EP2163
Lot 703 on EP2163
Lot 674 on EP2163

Address: Sir Leslie Theiss Drive

Use: Short term accommodation (Hotel)
Commercial premises
Research and Educational Facility
Carpark

Height: 3 Storey Commercial / Education / Retail
5 Storey Carpark
7 Storey Hotel

GFA: 8399m²
Site cover: 7166m² (82%)

Rooms: 99
Parking: 461 + Coach / taxi zones



CONTACT DETAILS

WEB: WWW.COUNTERPOINT.COM.AU
PHONE: 08 9438 4000
FAX: 08 9438 4001
EMAIL: 4075 26 | 3775 36
ROAD REG: 4075 26 | 3775 36
ABN: 91 618 847 008
GST: 12 618 847 008
OFFICE: 41 HUGHAM RD TOWNSVILLE 4810

PROJECT: TOWNSVILLE MARINE TOURISM PRECINCT

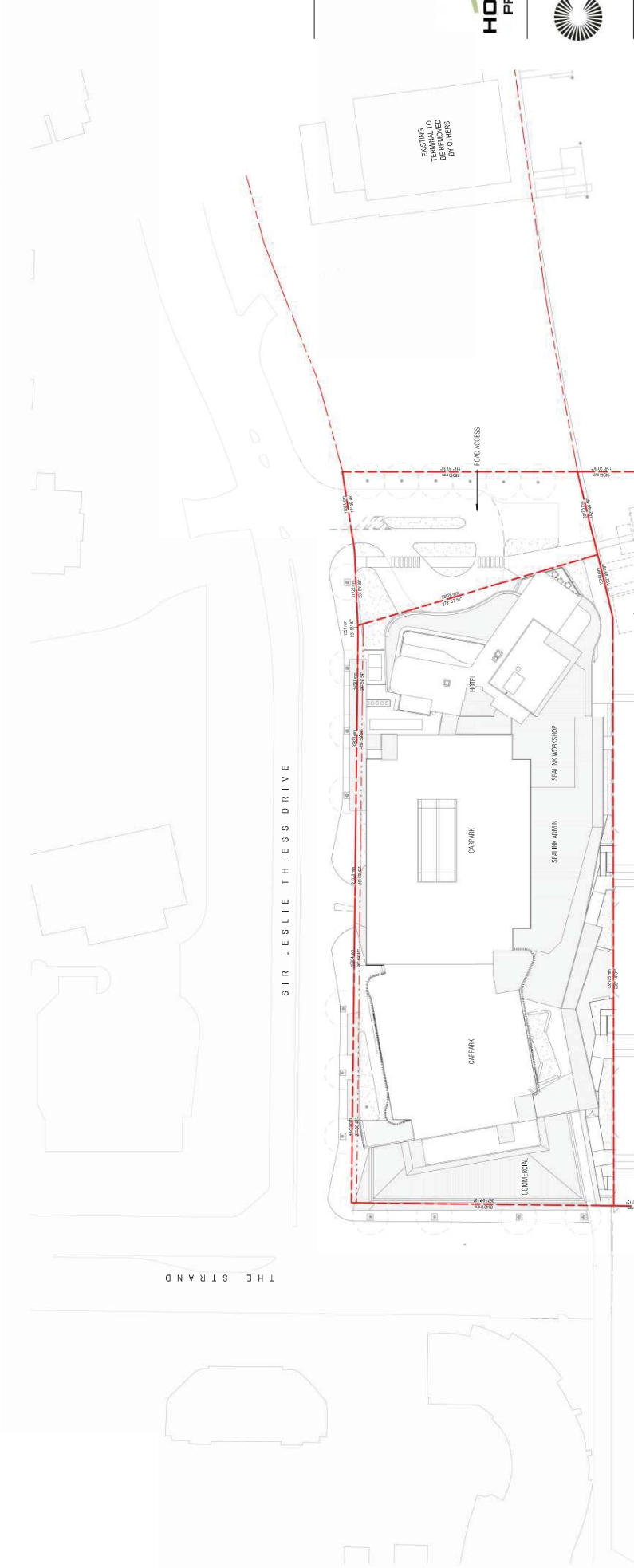
CLIENT DETAILS

HONEYCOMBES PROPERTY GROUP

DETAILS	12/04/19
PROJECT No.	12/04/19
DATE	12/04/19
APPROVED	Author
DRAWN	Author
SCALE AT A1	1:1000

REVISION
A 12/04/19 DEVELOPMENT APPLICATION

TITLE	
AREA DIAGRAMS + DEVELOPMENT SUMMARY	
DRAWING No.	DM002
ISSUE	A
DEVELOPMENT APPLICATION	



CONTACT DETAILS
 WEB: WWW.CPMG.COM.AU
 PHONE: 08 8363 4400
 EMAIL: HELLO@COUNTERPOINT.COM.AU
 4475 26 | 2772 MK
 ROAD REG: 91 018 847 008
 AUST: 1201419
 OFFICE: 41 NINGHAM RD TOWNSVILLE QLD

PROJECT: TOWNSVILLE MARINE TOURISM PRECINCT
 CLIENT DETAILS: HONEYCOMBES PROPERTY GROUP

DETAILS	120419
PROJECT No.	120419
DATE	12/04/19
APPROVED	MJW
DRAWN	FM
SCALE AT A1	1:500

REVISION
 A 120419 DEVELOPMENT APPLICATION

TITLE
 SITE PLAN

DRAWING No. **DM100** ISSUE **A**
 DEVELOPMENT APPLICATION

Legend - Hotel Room	
Code	Description
ES207	Screen 1: 1st Floor - Vertical Section View Screen



CONTACT DETAILS
WEB: WWW.COUNTERPOINT.COM.AU
EMAIL: INFO@COUNTERPOINT.COM.AU
PHONE: 08 9473 2000
ADDRESS: 4075 DE LAUNCEY AVENUE, WILLOWBROOK, VIC 3169
OFFICE: 41 INGHAM ROAD, TOWNSVILLE QLD 4810

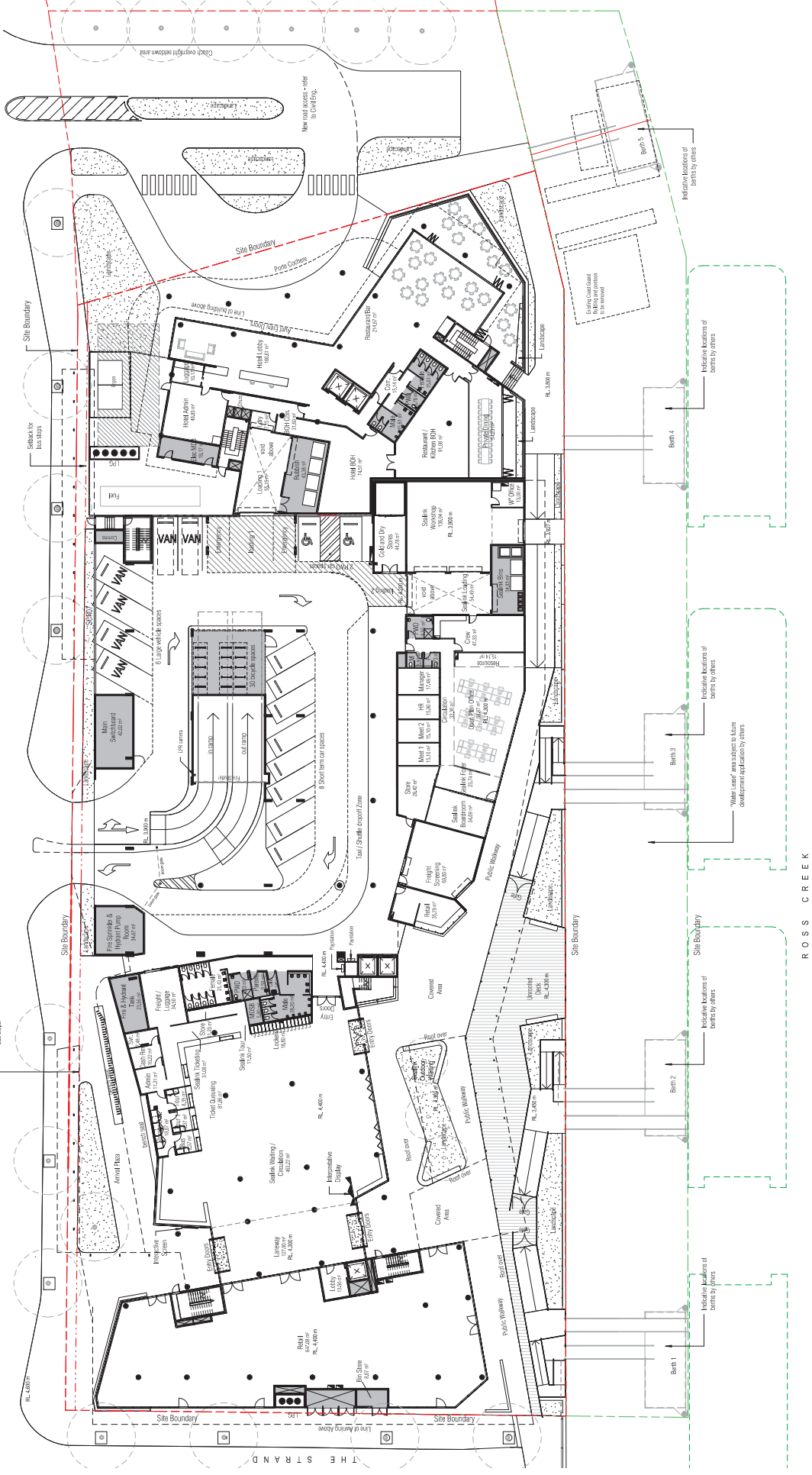
PROJECT: TOWNSVILLE MARINE TOURISM PRESENT
CLIENT DETAILS:
HONEYCOMBES PROPERTY GROUP

DESIGN NO.	120419
DATE	12/04/19
APPROVED	MAJOR
DRAWN	MAJOR
SCALE	AS SHOWN
SCALE	1:250

REVISION
A 12/04/19 DEVELOPMENT APPLICATION

TITLE	DRAWING NO.	ISSUE	APPLICATION
GROUND LEVEL	DA000	A	DEVELOPMENT APPLICATION

SIR LESLIE THIESS DRIVE



1 DA GROUND LEVEL PLAN
SCALE 1:250

Legend - Hotel Room	
Code	Description
MRS01	Master Room
SCR01	Screen Type 1 - Aluminum Uncoated Angled Vertical Blade
SCR02	Screen Type 2 - Aluminum Vertical Facade Blade to Ground
SCR03	Screen Type 3 - Perforated Aluminum Screen
SCR04	Screen Type 4 - Perforated Aluminum Panel Screen System to Ground



CONTACT DETAILS
WEB: WWW.COUNTERPOINT.COM.AU
ADDRESS: 4/100 DUNDAS STREET
BANK: 4072 26 | 2772 88
ROAD REG: 4072 26 | 2772 88
PHONE: 08 8318 8400
FAX: 08 8318 8401
OFFICE: 41 KINGHAM RD TOWNSVILLE 4810

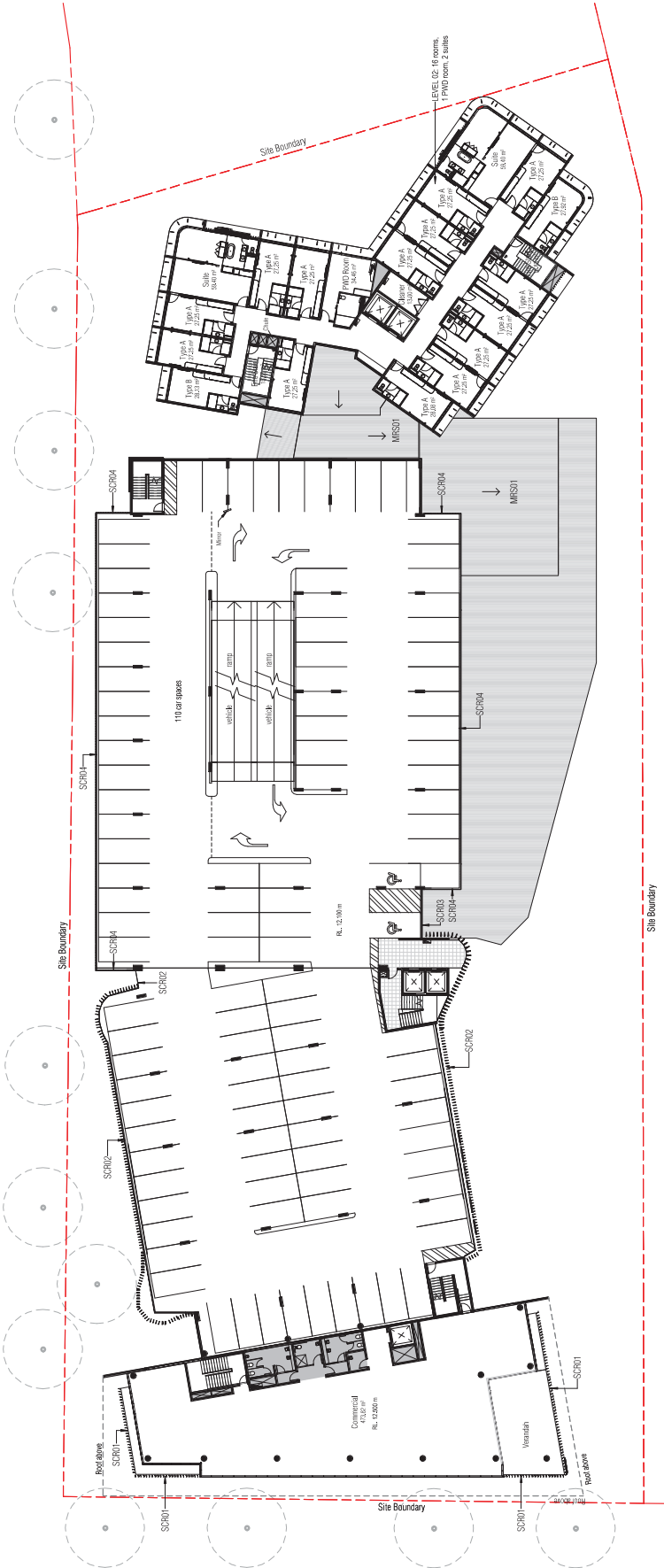
PROJECT: TOWNSVILLE MARINE TOURISM PRECINCT
CLIENT DETAILS: HONEYCOMBES PROPERTY GROUP

DETAILS	THAT
PROJECT No.	1204/19
DATE	12/04/19
APPROVED	MA/19
DRAWN	FM
SCALE AT A1	1:250

REVISION
A 12/04/19 DEVELOPMENT APPLICATION

TITLE
LEVEL 02

DRAWING No. **DA002** ISSUE **A**
DEVELOPMENT APPLICATION



① LEVEL 2 CARPARK
SCALE 1:250

Legend - Hotel Room	
Code	Description
SR001	Screen Type 1 - Aluminum Uncoated Anodized Vertical Blade
SR002	Screen Type 2 - Aluminum Vertical Facade Blade to curved
SR003	Screen Type 3 - Perforated Aluminum Screen
SR004	Screen Type 4 - Perforated Aluminum Panel Screen System to custom aluminum pattern



CONTACT DETAILS
WEB: WWW.COUNTERPOINT.COM.AU
ADDRESS: 4/100 WILSON ROAD, MELBOURNE VIC 3000
EMAIL: INFO@COUNTERPOINT.COM.AU
ROAD REG: 4075 ZR | 3775 MK
ABN: 91 618 846 808
GST: 12 618 846 808
OFFICE: PO BOX 1664 TOWNSVILLE QLD 4810
41 NINGHAM RD TOWNSVILLE QLD

PROJECT
TOWNSVILLE MARINE TOURISM PRESENT

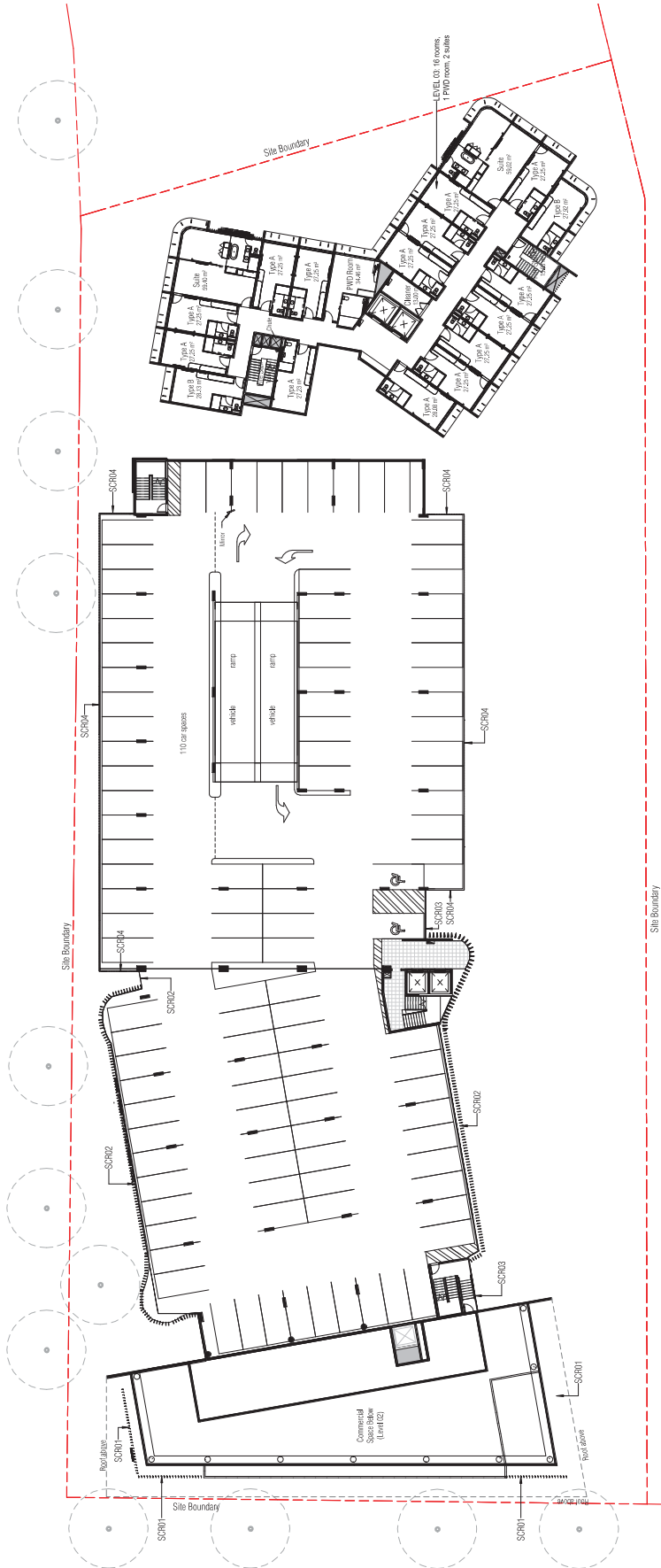
CLIENT DETAILS
HONEYCOMBES PROPERTY GROUP

DETAILS	12/04/19
PROJECT No.	120419
DATE	12/04/19
APPROVED	MV/19
DRAWN	TM
SCALE AT A1	1:250

REVISION
A 12/04/19 DEVELOPMENT APPLICATION

TITLE
LEVEL 03

DRAWING No. **DM003** ISSUE **A**
DEVELOPMENT APPLICATION



① LEVEL 3 CARPARK
SCALE: 1:250

Legend - Hotel Room	
Code	Description
MRS01	Mezz Floor Slabbing
SCR02	Screen Type 2 - Aluminium Vertical Faced Blinds to curved form
SCR03	Screen Type 3 - Solidated Aluminium Screen
SCR04	Screen Type 4 - Polycarbonate Aluminium Panel Screen System to custom artwork pattern



CONTACT DETAILS
WEB: WWW.COUNTERPOINT.COM.AU
ADDRESS: 4/100 SPYGLASS STREET
SYDNEY NSW 1585
EMAIL: HELLO@COUNTERPOINT.COM.AU
4075 26 | 2775 88
ROAD REG: 97 018 847 006
ABN: 61 970 184 700
GST: 12 618 470 006
OFFICE: 41 WINGHAM RD TOWNSVILLE QLD 4810

PROJECT
TOWNSVILLE MARINE TOURISM PRECINCT

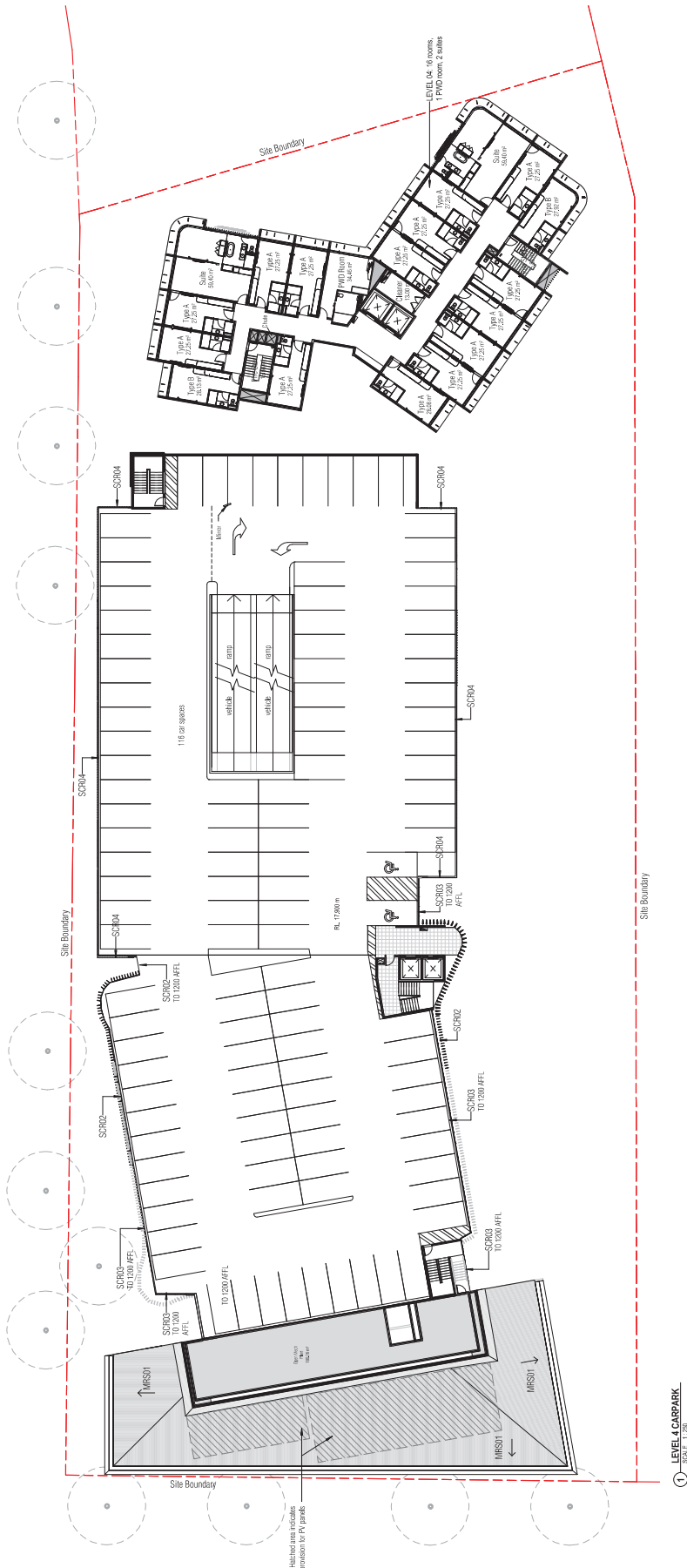
CLIENT DETAILS
HONEYCOMBES PROPERTY GROUP

DETAILS	THAT
PROJECT No.	120419
DATE	12/04/19
APPROVED	MJW
DRAWN	FM
SCALE AT A1	1:250

REVISION
A 12/04/19 DEVELOPMENT APPLICATION

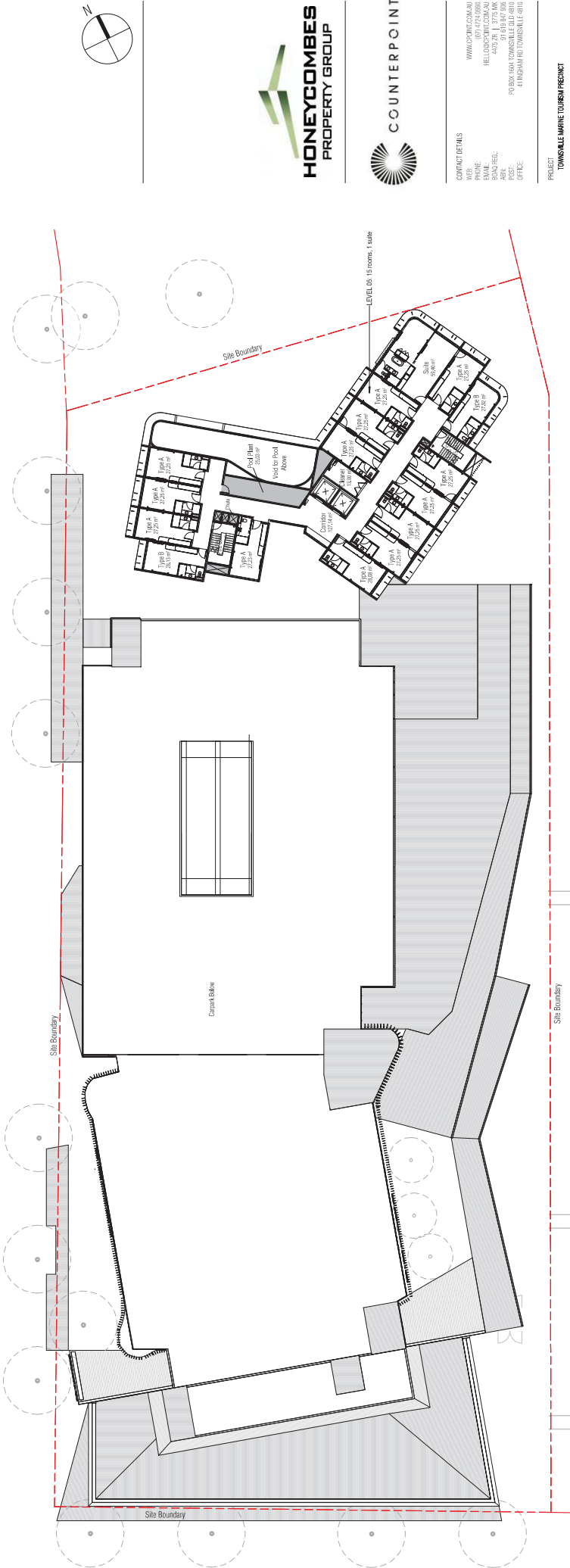
TITLE
LEVEL 04

DRAWING No. **D004** ISSUE **A**
DEVELOPMENT APPLICATION



① LEVEL 4 CARPARK
SCALE 1:250

Code	Description
Legend - Hotel Room	



1 DA - LEVEL 5 PLAN - HOTEL
SCALE 1:250

CONTACT DETAILS
WEB: WWW.COUNTERPOINT.CO.NZ
PHONE: 0800 222 222
EMAIL: INFO@COUNTERPOINT.CO.NZ
ROAD REG: 4479 ZR | 2775 MK
APT: PT 101/104/105
STREET: PO BOX 1004 TOWNHILLS AVE
OFFICE: 41 WINGHAM RD TOWNHILLS AVE

PROJECT
TOWNHILLS MARINE TOURISM PRECINCT

CLIENT DETAILS
HONEYCOMBES PROPERTY GROUP

DETAILS	
PROJECT No.	17047
DATE	12/04/19
APPROVED	MW/2
DRAWN	FM
SCALE AT A1	1:250

REVISION
A 12/04/19 DEVELOPMENT APPLICATION

TITLE	
LEVEL 05	

DRAWING No.	DM005	ISSUE	A
DEVELOPMENT APPLICATION			

Code	Description
Legend - Hotel Room	



CONTACT DETAILS
WEB: WWW.COUNTERPOINT.CO.NZ
PHONE: 06 336 6600
FAX: 06 336 6601
EMAIL: INFO@COUNTERPOINT.CO.NZ
4075 ZB | 3772 MK
ROAD REG: 10101849 008
POS BOX 16041 TOWNHILLS
AUCKLAND
OFFICE: 41 HINGHAM RD TOWNHILLS 4010

PROJECT: TOWNHILLS MARINE TOURISM PRESENT

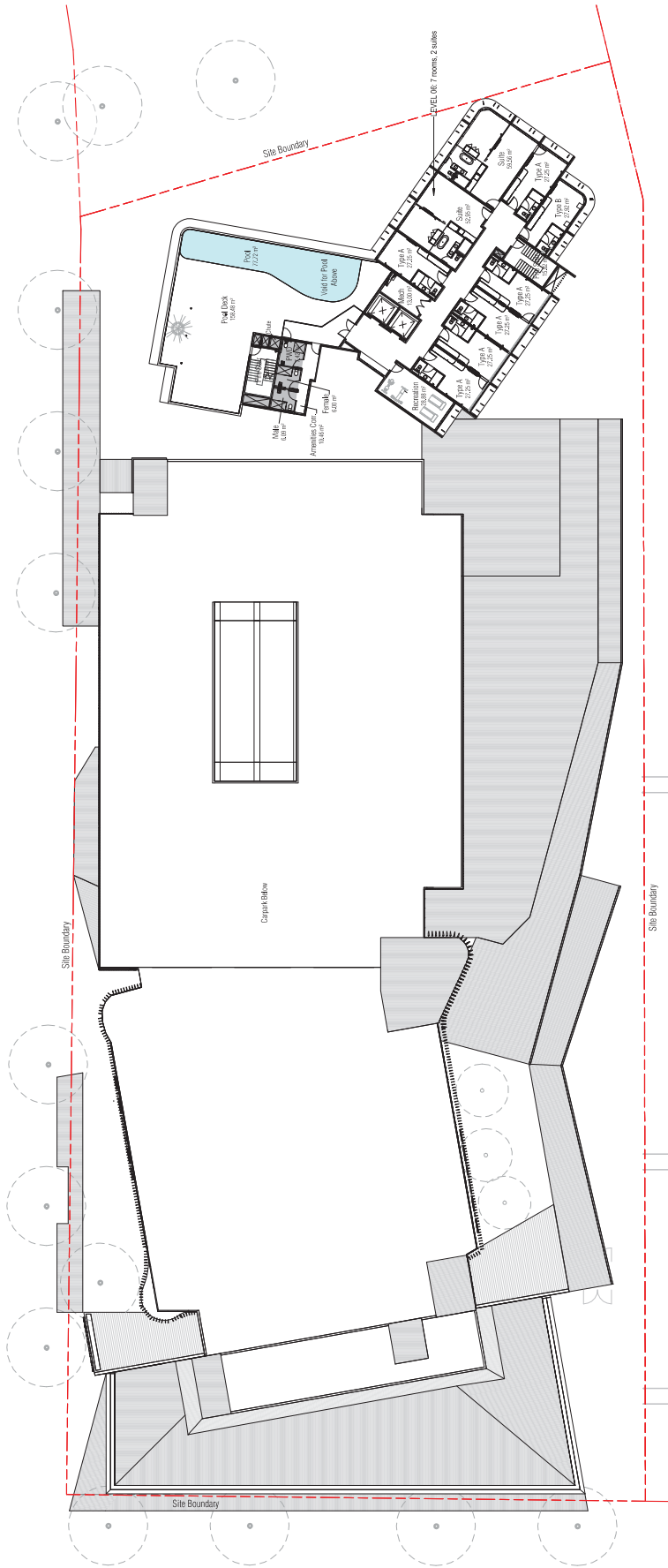
CLIENT DETAILS
HONEYCOMBES PROPERTY GROUP

DESIGNER	THAY
PROJECT No.	1204/19
DATE	12/04/19
APPROVED	MW/20
DRAWN	FM
SCALE AT A1	1:250

REVISION
A 12/04/19 DEVELOPMENT APPLICATION

TITLE	
LEVEL 06	

DRAWING No.	DM006	ISSUE	A
DEVELOPMENT APPLICATION			



1 DA - LEVEL 6 PLAN - HOTEL
SCALE 1:250

Code	Description
Legend - Hotel Room	



CONTACT DETAILS
WEB: WWW.COUNTERPOINT.CO.NZ
PHONE: 06 854 1234
EMAIL: INFO@COUNTERPOINT.CO.NZ
ROAD REG: 4079 26 | 2775 MK
ABN: 91 618 849 008
GST: 00000000000000000000
OFFICE: PO BOX 1664 TOWNSVILLE QLD
41 TINGHAM RD TOWNSVILLE QLD

PROJECT
TOWNSVILLE MARINE TOURISM PRECINCT

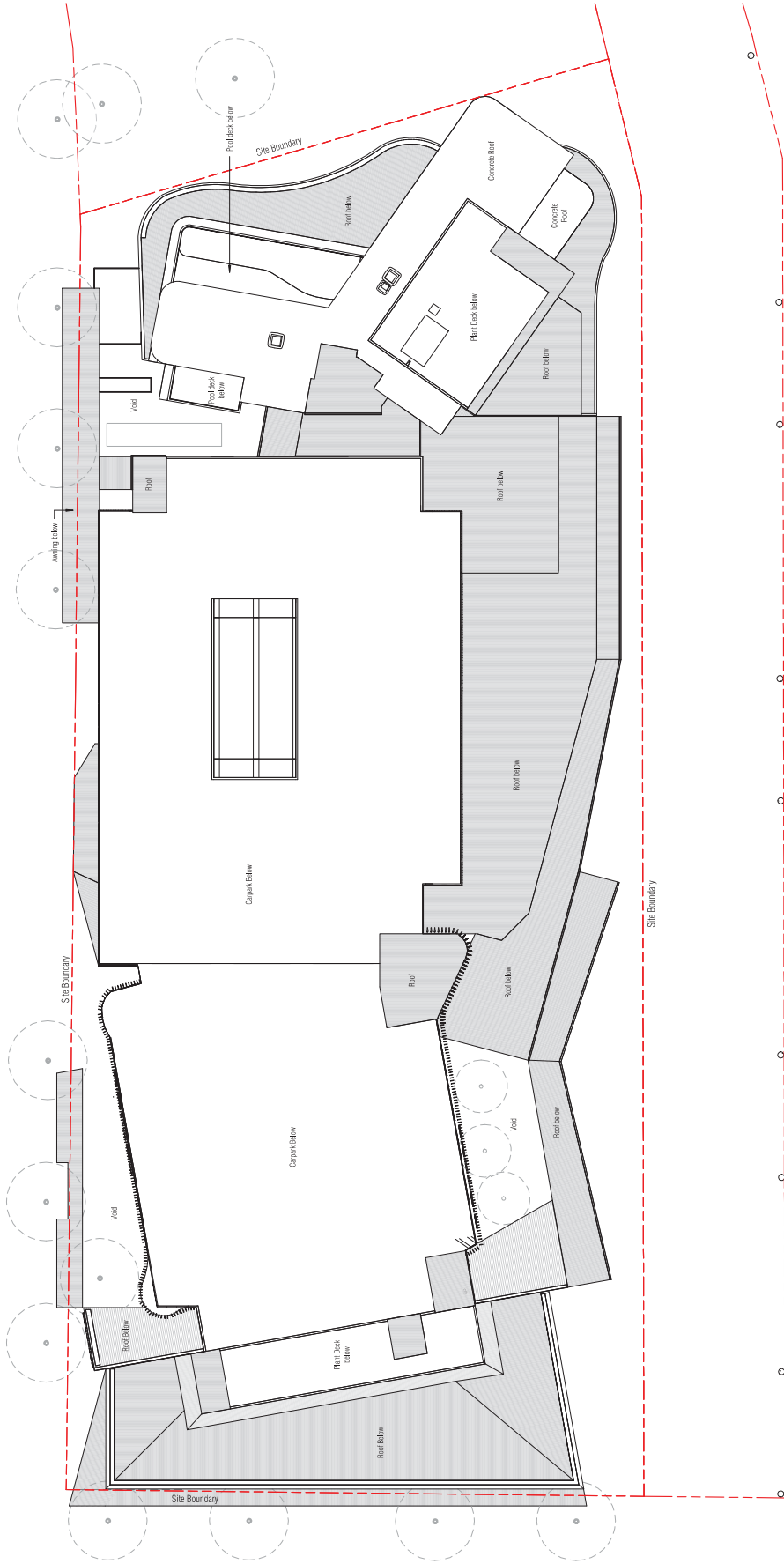
CLIENT DETAILS
HONEYCOMBES PROPERTY GROUP

DETAILS	THAT
PROJECT No.	120419
DATE	12/04/19
APPROVED	MA/19
DRAWN	FM
SCALE AT A1	1:250

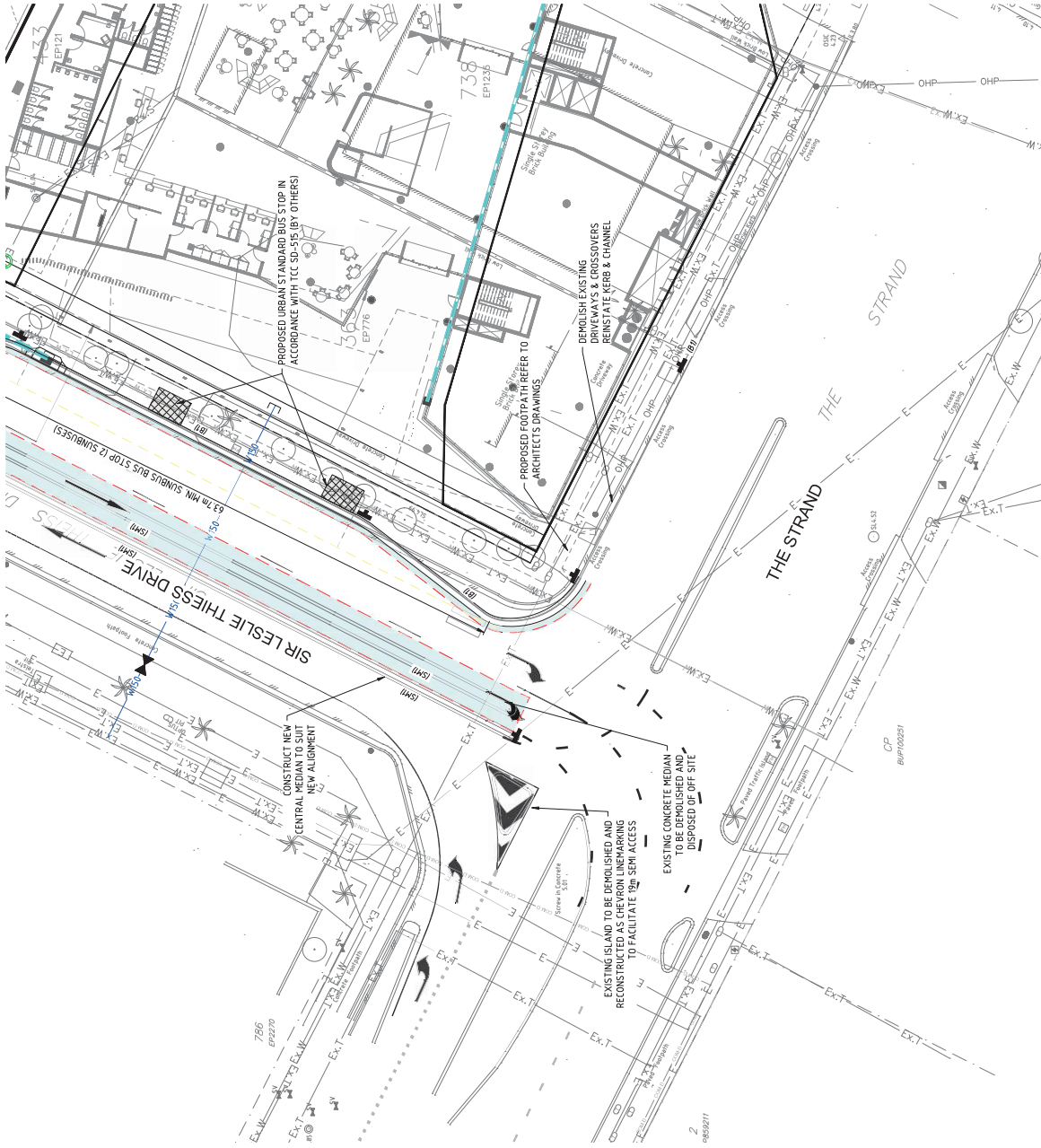
REVISION
A 12/04/19 DEVELOPMENT APPLICATION

TITLE
ROOF - HOTEL

DRAWING No. **DM007** ISSUE **A**
DEVELOPMENT APPLICATION



APPENDIX D
ROADWORKS LAYOUT PLANS



LEGEND:

- EXISTING OVERHEAD ELECTRICITY
- EXISTING SEWER MAIN
- EXISTING FENCE
- EXISTING TOP OF BANK
- EXISTING PROPERTY BOUNDARY
- EXISTING BUILDING
- PROPOSED ROAD CENTRELINE
- PROPOSED TOP OF BATTER
- PROPOSED CHANGE OF GRADE
- PROPOSED SWALE DRAIN PATH
- SURVEY BOUNDARY
- PROPOSED BARRIER KERB & CHANNEL (B1) AS PER TOWNSVILLE COUNCIL STD DWG SD-020
- PROPOSED SEMI MOUNTABLE KERB (SM1) AS PER TOWNSVILLE CITY COUNCIL STD DWG SD-020
- PROPOSED SEMI MOUNTABLE KERB (SM2) AS PER TOWNSVILLE CITY COUNCIL STD DWG SD-020
- PROPOSED DISH DRAIN (D1) AS PER TOWNSVILLE CITY COUNCIL STD DWG SD-020

DENOTES SIGN AND POST

HATCHING LEGEND

- EXTENT OF FLEXIBLE PAVEMENT, REFER PAVEMENT DESIGN ON STP DRAWING SKC007
- EXTENT OF 100mm THICK CONCRETE PATHWAY, REFER TO TOWNSVILLE CITY COUNCIL STD DWG SD-070 FOR DETAILS
- EXTENT OF 100mm THICK CONCRETE PATHWAY, REFER TO TOWNSVILLE CITY COUNCIL STD DWG SD-070 FOR DETAILS
- 150mm THICK S32 FIBRE REINFORCED CONCRETE INFILL WITH STENCILLED SPRAY-ON COAT
- CONCRETE KERBBING AS PER PINE RIVERS SHIRE COUNCIL STD DWG 8-10044

LINEMARKING NOTES

- ALL PAVEMENT MARKING AND TRAFFIC SIGNS TO BE IN ACCORDANCE WITH THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES".
- ALL TRAFFIC SIGNS TO BE INSTALLED IN ACCORDANCE WITH THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES".
- ALL EXISTING SIGNS WITHIN NEW WORKS ARE TO BE RELOCATED OR REMOVED TO SUIT, CONTRACTOR TO LIAISE WITH CLIENT ON PREFERRED LOCATION.



LEVEL DATUM

PM No. 1906040
LEVEL DATUM RL 4.094m AND DERIVED

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	Project: Townsville Marine Tourism Precinct		
	Drawing /Sketch No : STP18-1990-SKC002		
	Title: ROADWORKS LAYOUT PLAN (1 of 3)		
Revision: E	Date: 05/02/19		



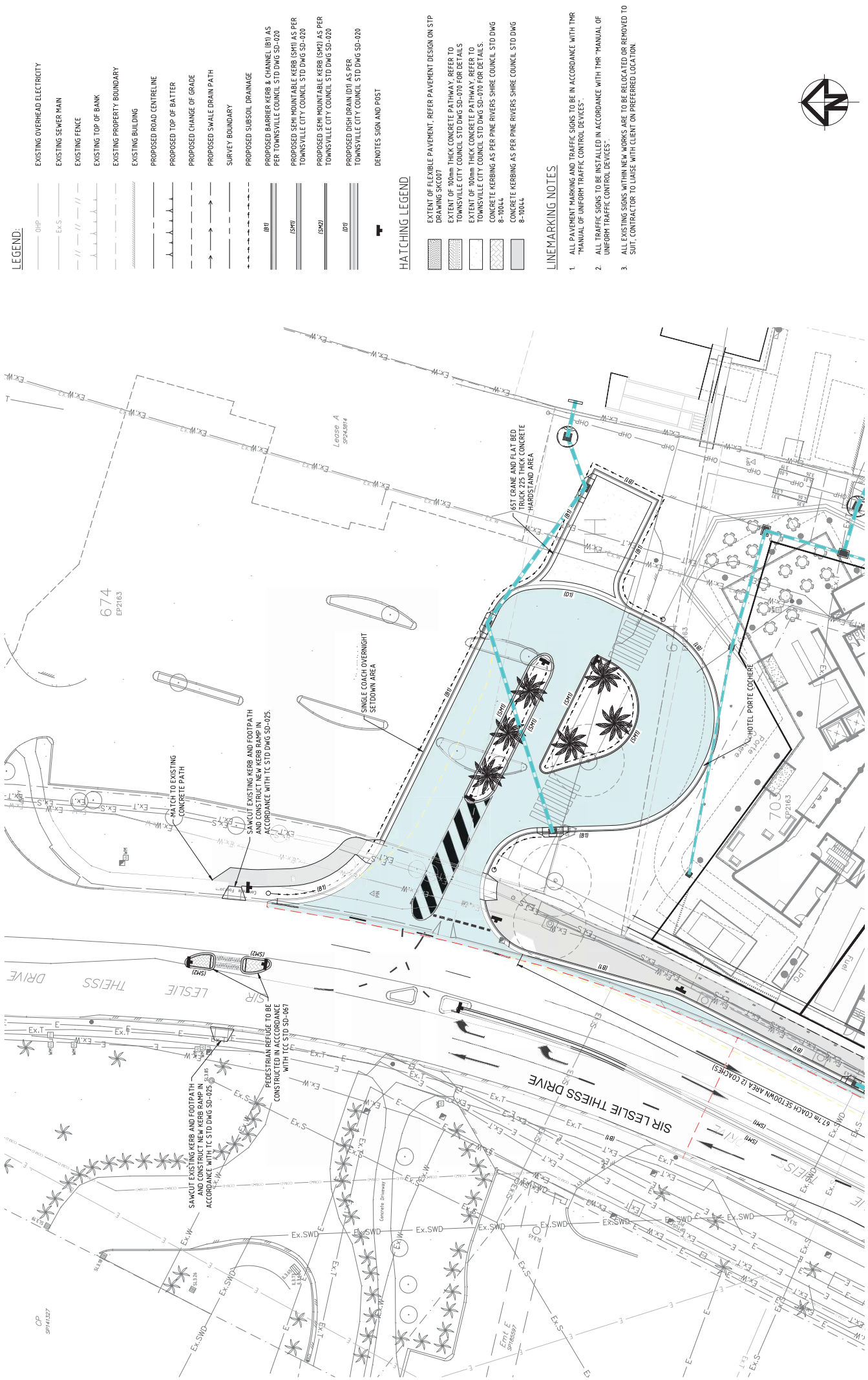
STOP CONSULTANTS	Project: Townsville Marine Tourism Precinct		
	Drawing / Sketch No.: STPB-1990-SKC003		
	Title: ROADWORKS LAYOUT PLAN (2 of 3)		
Revision: D	Date: 05/02/19		

LEVEL DATUM

PP No. 196040
LEVEL DATUM RL 4.094m AND DERIVED

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SCALE 1:200 (A1) 1:400 (A3)
DO NOT SCALE OFF THIS DRAWING



LEGEND:

- EXISTING OVERHEAD ELECTRICITY
- EXISTING SEWER MAIN
- EXISTING FENCE
- EXISTING TOP OF BANK
- EXISTING PROPERTY BOUNDARY
- EXISTING BUILDING
- PROPOSED ROAD CENTRELINE
- PROPOSED TOP OF BATTER
- PROPOSED CHANGE OF GRADE
- PROPOSED SWALE DRAIN PATH
- SURVEY BOUNDARY
- PROPOSED SUBSOIL DRAINAGE
- PROPOSED BARRIER KERB & CHANNEL (BT) AS PER TOWNSVILLE COUNCIL STD DWG SD-020
- PROPOSED SEMI MOUNTABLE KERB (SMK) AS PER TOWNSVILLE CITY COUNCIL STD DWG SD-020
- PROPOSED SEMI MOUNTABLE KERB (SM2) AS PER TOWNSVILLE CITY COUNCIL STD DWG SD-020
- PROPOSED DISH DRAIN (DI) AS PER TOWNSVILLE CITY COUNCIL STD DWG SD-020
- DENOTES SIGN AND POST

HATCHING LEGEND

- EXTENT OF FLEXIBLE PAVEMENT. REFER PAVEMENT DESIGN ON STP DRAWING SKC007
- EXTENT OF 100mm THICK CONCRETE PATHWAY. REFER TO TOWNSVILLE CITY COUNCIL STD DWG SD-070 FOR DETAILS
- EXTENT OF 100mm THICK CONCRETE PATHWAY. REFER TO TOWNSVILLE CITY COUNCIL STD DWG SD-070 FOR DETAILS
- CONCRETE KERBBING AS PER PINE RIVERS SHIRE COUNCIL STD DWG 8-100/4
- CONCRETE KERBBING AS PER PINE RIVERS SHIRE COUNCIL STD DWG 8-100/4

LINEMARKING NOTES

- ALL PAVEMENT PARKING AND TRAFFIC SIGNS TO BE IN ACCORDANCE WITH THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES"
- ALL TRAFFIC SIGNS TO BE INSTALLED IN ACCORDANCE WITH THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES"
- ALL EXISTING SIGNS WITHIN NEW WORKS ARE TO BE RELOCATED OR REMOVED TO SUI, CONTRACTOR TO LAISE WITH CLIENT ON PREFERRED LOCATION



LEVEL DATUM

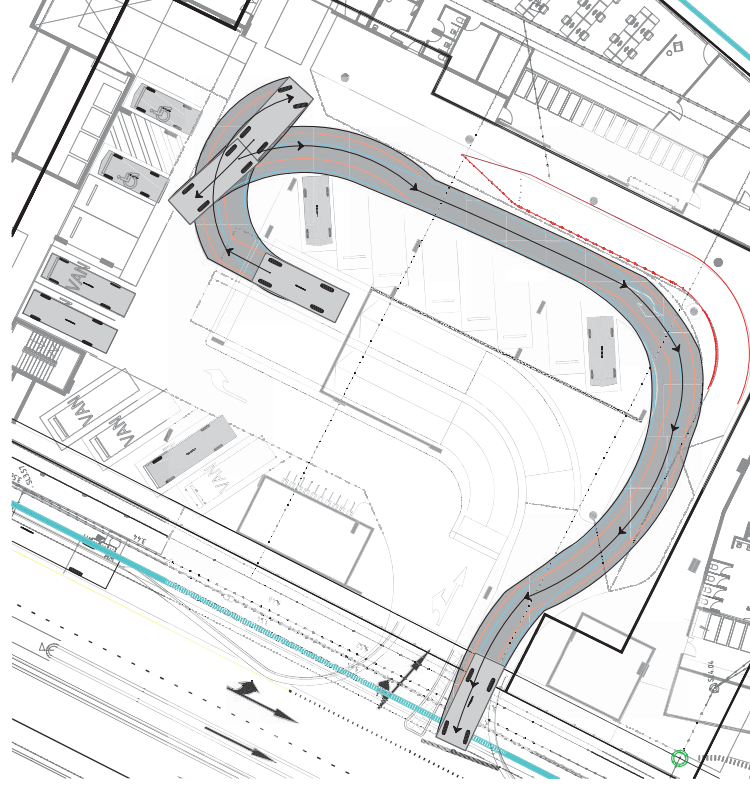
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Project: Townsville Marine Tourism Precinct
Drawing /Sketch No : STPB-1990-SKC004
Title: ROADWORKS LAYOUT PLAN (3 of 3)

Revision: D

Date: 05/02/19



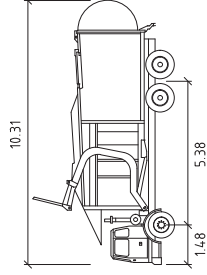
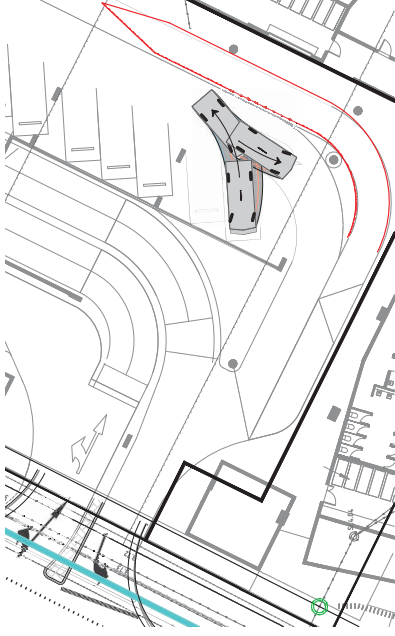
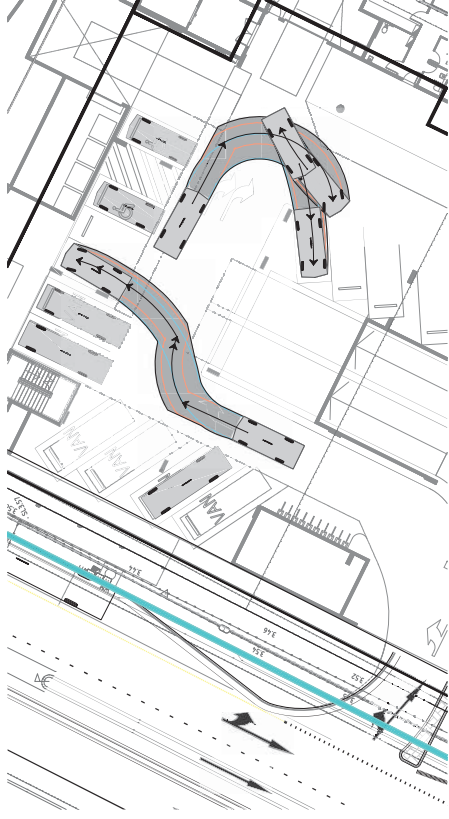
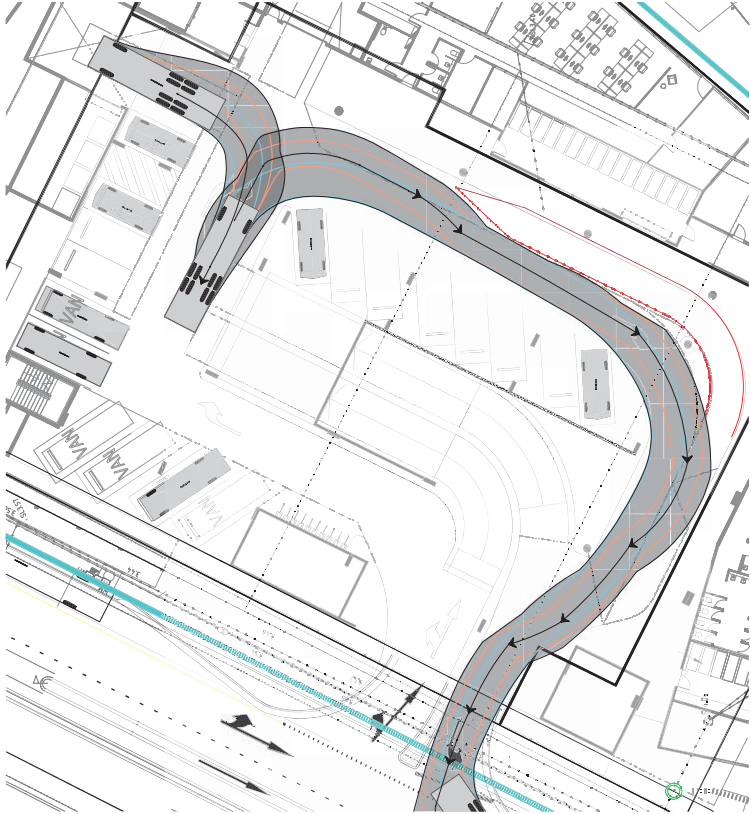
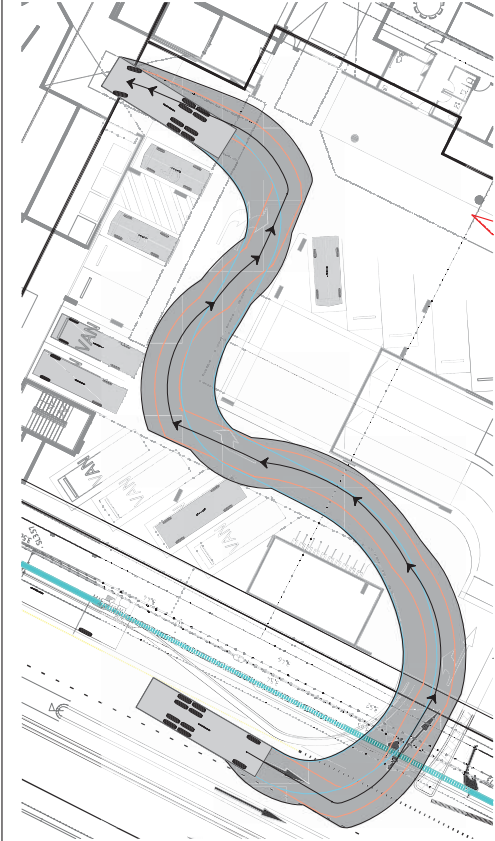
LEVEL DATUM

PM No. 136040
LEVEL DATUM RL 4.096 AHD DERIVE
SITE COORDINATES E000000 N000000



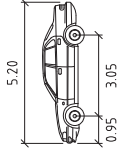
SCALE 1:200 (A1) 1:400 (A3)
DO NOT SCALE USE ONLY THE DIMENSIONS PROVIDED

IN ASSOCIATION WITH																				NOT FOR CONSTRUCTION																													
Client										HONEYCOMBES PROPERTY										Office In: Design Townsville: Drawn Brisbane: Ph. 07 3539 8300 Cairns: Ph. 07 3539 8300 Mackay: Ph. 07 3539 8300 www.stpconsultants.com.au										Job Number STP18-1390										Drawing Number SKC009									
Project										TOWNSVILLE SEALINK TERMINAL																																							
Title										VEHICLE TURNING PATH (SHEET 2 OF 3)										Checkered										Certified																			
Description										HJD: KEM 01.03.19 NAF: KEM 26.02.19										Certified										Rev																			
Rev										A PRELIMINARY B										Certified										Rev																			



Wayne Titan

Width	: 1.94
Track	: 186
Lock to Lock Time	: 6.0
Steering Angle	: 33.6



Passenger-Car

Width	: 1.94
Track	: 186
Lock to Lock Time	: 6.0
Steering Angle	: 33.6

LEVEL DATUM
PM No. 13604.0
LEVEL DATUM RL 4.096 AHD DERIVED
SITE COORDINATES E00000 N00000



IN ASSOCIATION WITH										Client		HONEYCOMBES PROPERTY										TOWNSVILLE SEALINK TERMINAL										VEHICLE TURNING PATH (SHEET 3 OF 3)													
										Project																																			
										Title																																			
Description										By		Date																																	
B REVISED SET										HJD		KEM		01.03.19																															
A PRELIMINARY										MAF		KEM		24.02.19																															
Rev										Description		By		Date																															
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APPENDIX E

SEALINK ADVICE

From: Blair Shillington <blairs@honeycombes.com>
Sent: Wednesday, 14 November 2018 1:44 PM
To: Zammi Rohan <zammi@cpoint.com.au>; Michael Rogers <michaelr@honeycombes.com>
Cc: Russell Perkins <Russell.Perkins@premise.com.au>; Mark Kennedy <mark@cpoint.com.au>; Peter Honeycombe <peterh@honeycombes.com>; Vanessa Honeycombe <vanessah@honeycombes.com>; Andrew Dowling <andrewd@honeycombes.com>; Chris Briggs <Chris.Briggs@sealink.com.au>
Subject: RE: TMTP - Traffic Workshop

Hi Zammi

Regarding point 11 in your email below...Please see information/movements as provided by Chris Briggs below.

Car parking numbers to remain at 400 in multi-level car park.

Suspect Premise can allow for additional traffic generated as a result of 100 – 120 room hotel.

Ideally a new site / and or facility will provide the current mix of activity that is required to provide a successful transport and tourism hub that is capable of providing amenities, comfort and convenient traffic flow for;

- *One million passenger movements annually; SeaLink's customers arrive and depart from;*
 - *75,000 car movements – car parking; (capacity car park 320 at 65% usage annually)*
 - *75,000 car drops – 2 minutes;*
 - *3000 interstate coach movements;*
 - *8000 Local Bus connections;*
 - *3000 School bus connections;*
 - *500 Tourist bus connections;*
 - *Walk and cycle connections:*

Kind Regards,

Blair Shillington
Sales & Marketing Manager



T: (07) 4760 2929
M: 0419 661 112
E: blairs@honeycombes.com
281 Sturt Street, Townsville Qld 4810
PO Box 9, Townsville Qld 4810
honeycombesproperty.com.au | [LinkedIn](#)



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From: Zammi Rohan [<mailto:zammi@cpoint.com.au>]
Sent: Wednesday, 14 November 2018 12:16 PM
To: Michael Rogers
Cc: Russell Perkins; Mark Kennedy; Peter Honeycombe; Blair Shillington; Vanessa Honeycombe; Andrew Dowling
Subject: Re: TMTP - Traffic Workshop

Hi All

A summary of our meeting with Premise below

Attendees:

APPENDIX F
SIDRA OUTPUT – WITH DEVELOPMENT NEW ACCESS ROAD
INTERSECTION

SITE LAYOUT

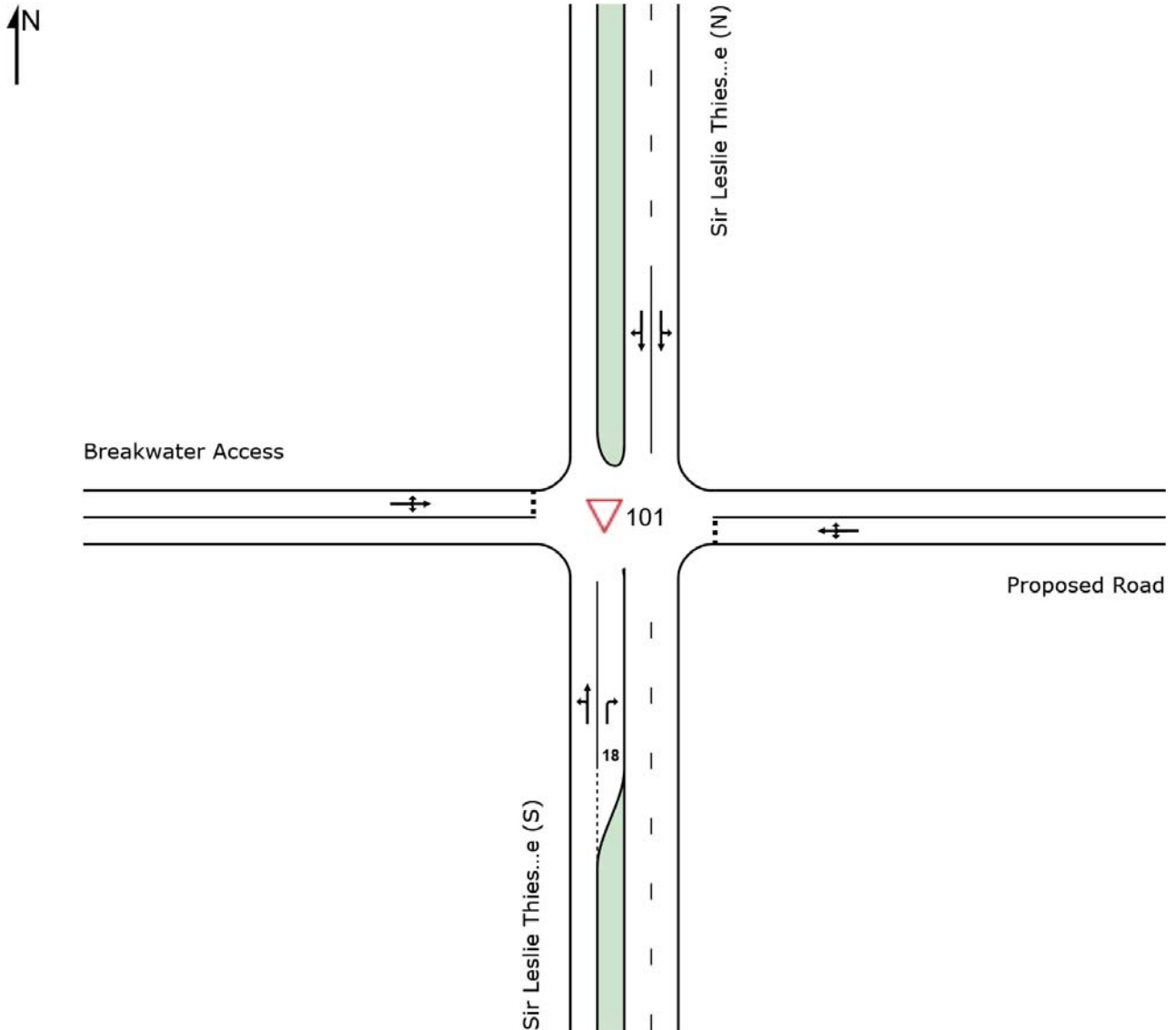
▽ Site: 101 [Opt 5 AM Priority Intersection]

Priority intersection (option 5) replacing the proposed roundabout (option 4)

With morning peak hour traffic volumes

Site Category: (None)

Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

▽ Site: 101 [Opt 5 AM Priority Intersection]

Priority intersection (option 5) replacing the proposed roundabout (option 4)

With morning peak hour traffic volumes

Site Category: (None)

Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Sir Leslie Thiess Drive (S)												
1	L2	9	0.0	0.093	2.7	LOS A	0.0	0.0	0.00	0.03	0.00	5.7
2	T1	157	14.1	0.093	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
3	R2	202	5.2	0.166	3.2	LOS A	0.7	5.3	0.28	0.53	0.28	27.6
Approach		368	8.9	0.166	1.9	NA	0.7	5.3	0.15	0.30	0.15	48.0
East: Proposed Road												
4	L2	202	5.2	0.171	4.2	LOS A	0.7	5.0	0.18	0.53	0.18	32.8
5	T1	1	0.0	0.171	9.0	LOS A	0.7	5.0	0.18	0.53	0.18	9.3
6	R2	1	0.0	0.171	10.8	LOS B	0.7	5.0	0.18	0.53	0.18	50.4
Approach		204	5.2	0.171	4.3	LOS A	0.7	5.0	0.18	0.53	0.18	32.8
North: Sir Leslie Thiess Drive (N)												
7	L2	1	0.0	0.039	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	49.3
8	T1	136	15.5	0.039	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	59.8
9	R2	1	0.0	0.039	6.0	LOS A	0.0	0.1	0.01	0.01	0.01	49.4
Approach		138	15.3	0.039	0.1	NA	0.0	0.1	0.01	0.01	0.01	59.6
West: Breakwater Access												
10	L2	1	0.0	0.079	3.5	LOS A	0.3	2.0	0.66	0.82	0.66	41.8
11	T1	1	0.0	0.079	7.0	LOS A	0.3	2.0	0.66	0.82	0.66	16.3
12	R2	23	4.5	0.079	13.0	LOS B	0.3	2.0	0.66	0.82	0.66	19.1
Approach		25	4.2	0.079	12.3	LOS B	0.3	2.0	0.66	0.82	0.66	20.9
All Vehicles		736	8.9	0.171	2.6	NA	0.7	5.3	0.15	0.33	0.15	47.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Opt 5 PM Priority Intersection]

Priority intersection (option 5) replacing the proposed roundabout (option 4)

With evening peak hour traffic volumes

Site Category: (None)

Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Sir Leslie Thiess Drive (S)												
1	L2	23	4.5	0.084	2.7	LOS A	0.0	0.0	0.00	0.08	0.00	5.7
2	T1	128	10.7	0.084	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	59.2
3	R2	196	4.8	0.162	3.3	LOS A	0.7	5.2	0.29	0.53	0.29	27.6
Approach		347	7.0	0.162	2.0	NA	0.7	5.2	0.16	0.34	0.16	43.5
East: Proposed Road												
4	L2	189	5.0	0.161	4.3	LOS A	0.6	4.7	0.18	0.53	0.18	32.8
5	T1	1	0.0	0.161	8.7	LOS A	0.6	4.7	0.18	0.53	0.18	9.3
6	R2	1	0.0	0.161	10.2	LOS B	0.6	4.7	0.18	0.53	0.18	50.4
Approach		192	4.9	0.161	4.3	LOS A	0.6	4.7	0.18	0.53	0.18	32.7
North: Sir Leslie Thiess Drive (N)												
7	L2	1	0.0	0.041	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	49.3
8	T1	149	9.9	0.041	0.0	LOS A	0.0	0.1	0.00	0.01	0.00	59.8
9	R2	1	0.0	0.041	5.9	LOS A	0.0	0.1	0.01	0.01	0.01	49.4
Approach		152	9.7	0.041	0.1	NA	0.0	0.1	0.00	0.01	0.00	59.7
West: Breakwater Access												
10	L2	1	0.0	0.031	3.4	LOS A	0.1	0.7	0.57	0.72	0.57	43.9
11	T1	1	0.0	0.031	6.6	LOS A	0.1	0.7	0.57	0.72	0.57	18.4
12	R2	9	0.0	0.031	11.4	LOS B	0.1	0.7	0.57	0.72	0.57	21.3
Approach		12	0.0	0.031	10.2	LOS B	0.1	0.7	0.57	0.72	0.57	25.2
All Vehicles		702	6.9	0.162	2.4	NA	0.7	5.2	0.14	0.32	0.14	46.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

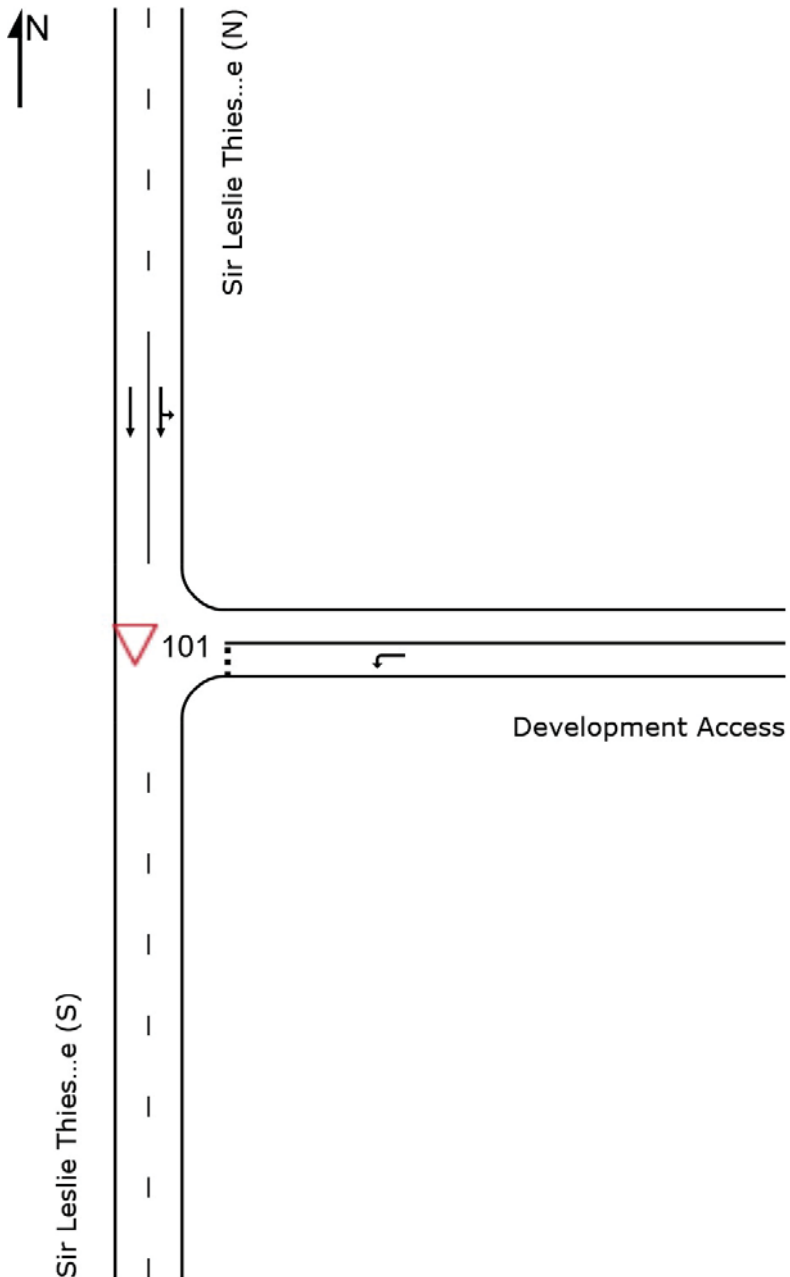
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX G
SIDRA OUTPUT – WITH DEVELOPMENT LEFT-IN LEFT-OUT
ACCESS

SITE LAYOUT

▽ Site: 101 [Opt4 AM SLTD East Access]

Option 4
Sir Leslie Thies Drive Eastern Access to the Development
With Development Morning Peak Hour Traffic Volumes
Site Category: (None)
Giveaway / Yield (Two-Way)



MOVEMENT SUMMARY

▽ Site: 101 [Opt4 AM SLTD East Access]

Option 4
 Sir Leslie Thiess Drive Eastern Access to the Development
 With Development Morning Peak Hour Traffic Volumes
 Site Category: (None)
 Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Development Access												
4	L2	28	3.7	0.018	3.0	LOS A	0.1	0.5	0.12	0.49	0.12	31.8
Approach		28	3.7	0.018	3.0	LOS A	0.1	0.5	0.12	0.49	0.12	31.8
North: Sir Leslie Thiess Drive (N)												
7	L2	135	4.7	0.100	5.1	LOS A	0.0	0.0	0.00	0.45	0.00	24.7
8	T1	226	11.2	0.100	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	56.1
Approach		361	8.7	0.100	1.9	NA	0.0	0.0	0.00	0.22	0.00	40.2
All Vehicles		389	8.4	0.100	2.0	NA	0.1	0.5	0.01	0.24	0.01	39.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Opt4 PM SLTD East Access]

Option 4
 Sir Leslie Thiess Drive Eastern Access to the Development
 With Development Evening Peak Hour Traffic Volumes
 Site Category: (None)
 Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Development Access												
4	L2	172	4.9	0.120	3.3	LOS A	0.5	3.8	0.24	0.51	0.24	31.0
Approach		172	4.9	0.120	3.3	LOS A	0.5	3.8	0.24	0.51	0.24	31.0
North: Sir Leslie Thiess Drive (N)												
7	L2	45	4.7	0.094	5.1	LOS A	0.0	0.0	0.00	0.16	0.00	29.3
8	T1	303	7.3	0.094	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	56.5
Approach		348	6.9	0.094	0.7	NA	0.0	0.0	0.00	0.08	0.00	51.8
All Vehicles		520	6.3	0.120	1.5	NA	0.5	3.8	0.08	0.22	0.08	44.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX H
SIDRA OUTPUT – WITH DEVELOPMENT THE STRAND / SIR
LESLIE THIESS DRIVE

SITE LAYOUT

▽ Site: 102 [Opt4 AM T-Int Strand/SLTD]

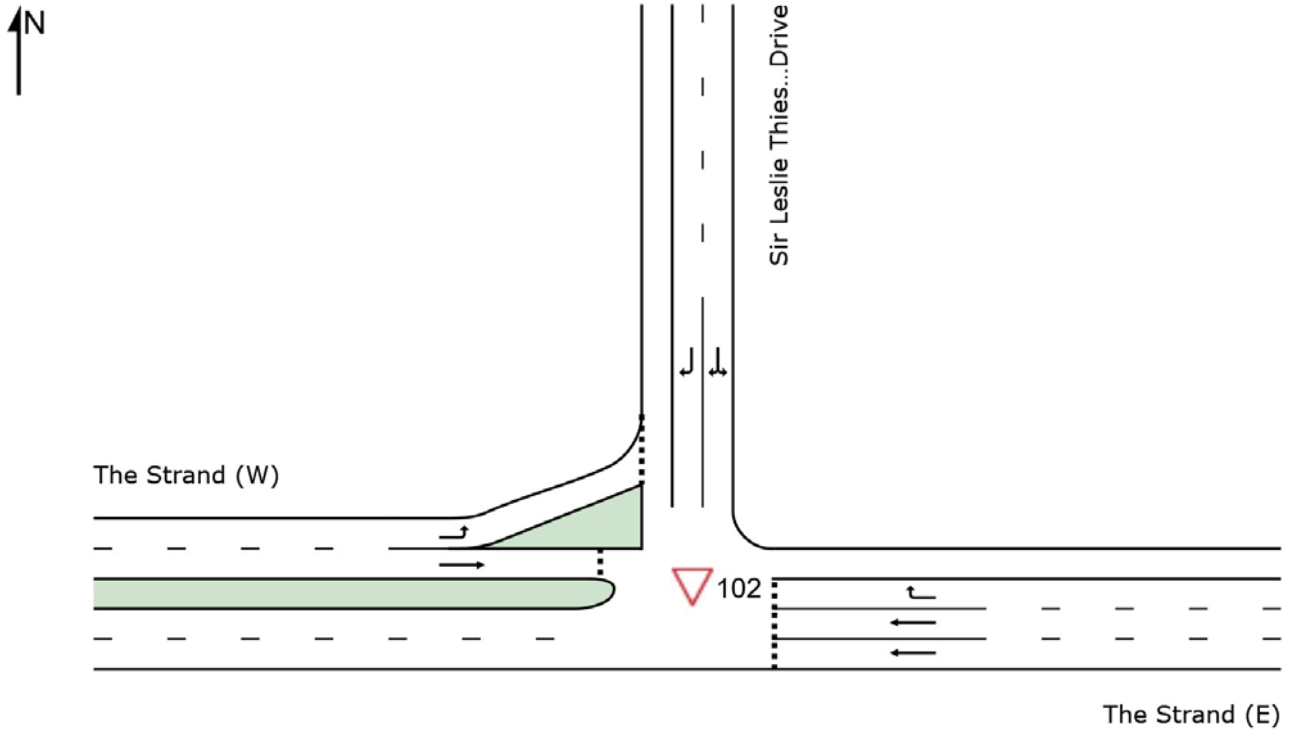
Option 4

T-Intersection - The Strand / Sir Leslie Thiess Drive

With Development Morning Peak Hour Traffic Volumes

Site Category: (None)

Giveaway / Yield (Two-Way)



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Organisation: PREMISE GROUP SERVICES PTY LTD | Created: Friday, 25 January 2019 1:41:25 PM

Project: U:\Job Data\HON\0031\Engineering Design\Traffic\SIDRA\HON-00031 R01.sip8

MOVEMENT SUMMARY

▽ Site: 102 [Opt4 AM T-Int Strand/SLTD]

Option 4
T-Intersection - The Strand / Sir Leslie Thiess Drive
With Development Morning Peak Hour Traffic Volumes
Site Category: (None)
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: The Strand (E)												
5	T1	218	4.8	0.093	4.5	LOS A	0.3	2.5	0.33	0.55	0.33	50.9
6	R2	1	0.0	0.001	6.4	LOS A	0.0	0.0	0.40	0.56	0.40	36.1
Approach		219	4.8	0.093	4.5	LOS A	0.3	2.5	0.33	0.55	0.33	50.8
North: Sir Leslie Thiess Drive												
7	L2	1	0.0	0.074	4.7	LOS A	0.0	0.0	0.00	0.57	0.00	33.5
9	R2	255	10.3	0.074	4.7	LOS A	0.0	0.0	0.00	0.57	0.00	50.0
Approach		256	10.3	0.074	4.7	NA	0.0	0.0	0.00	0.57	0.00	50.0
West: The Strand (W)												
10	L2	314	9.4	0.201	5.7	LOS A	1.0	7.3	0.01	0.54	0.01	50.9
11	T1	171	4.9	0.162	5.9	LOS A	0.6	4.5	0.41	0.63	0.41	48.6
Approach		484	7.8	0.201	5.8	LOS A	1.0	7.3	0.15	0.57	0.15	50.1
All Vehicles		959	7.8	0.201	5.2	NA	1.0	7.3	0.15	0.57	0.15	50.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: PREMISE GROUP SERVICES PTY LTD | Processed: Tuesday, 16 April 2019 12:04:43 PM

Project: U:\Job Data\HON\0031\Engineering Design\Traffic\SIDRA\HON-0031 Analysis R01 Rev B.sip8

MOVEMENT SUMMARY

▽ Site: 102 [Opt4 PM T-Int Strand/SLTD]

Option 4
T-Intersection - The Strand / Sir Leslie Thiess Drive
With Development Evening Peak Hour Traffic Volumes
Site Category: (None)
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: The Strand (E)												
5	T1	171	4.9	0.090	5.5	LOS A	0.3	2.4	0.45	0.64	0.45	50.0
6	R2	1	0.0	0.002	8.0	LOS A	0.0	0.0	0.51	0.61	0.51	33.6
Approach		172	4.9	0.090	5.5	LOS A	0.3	2.4	0.45	0.64	0.45	49.9
North: Sir Leslie Thiess Drive												
7	L2	1	0.0	0.134	4.7	LOS A	0.0	0.0	0.00	0.57	0.00	33.5
9	R2	475	6.4	0.134	4.7	LOS A	0.0	0.0	0.00	0.57	0.00	50.0
Approach		476	6.4	0.134	4.7	NA	0.0	0.0	0.00	0.57	0.00	50.0
West: The Strand (W)												
10	L2	213	8.4	0.136	5.7	LOS A	0.6	4.5	0.01	0.54	0.01	51.0
11	T1	218	4.8	0.251	7.2	LOS A	1.0	7.2	0.53	0.75	0.53	47.5
Approach		431	6.6	0.251	6.4	LOS A	1.0	7.2	0.27	0.65	0.28	49.2
All Vehicles		1078	6.3	0.251	5.5	NA	1.0	7.2	0.18	0.61	0.18	49.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX I
SIDRA OUTPUT – WITH DEVELOPMENT FLOW SCALE
ANALYSIS

LANE SUMMARY

▽ Site: 102 [Opt4 AM T-Int Strand/SLTD - Sensitivity]

Option 4

T-Intersection - The Strand / Sir Leslie Thiess Drive

With Development Morning Peak Hour Traffic Volumes

Site Category: (None)

Giveaway / Yield (Two-Way)

Flow Scale Analysis (Level of Service Target (Worst Vehicle Movement)): Results for Flow Scale (chosen as largest for any movement) = 397.0 %

Lane Use and Performance													
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
								Veh	Dist m				
East: The Strand (E)													
Lane 1	109	4.8	487	0.224	100	10.4	LOS B	0.8	5.9	Full	70	0.0	0.0
Lane 2	109	4.8	487	0.224	100	10.4	LOS B	0.8	5.9	Full	70	0.0	0.0
Lane 3	1	0.0	305	0.003	100	14.1	LOS B	0.0	0.1	Full	70	0.0	0.0
Approach	219	4.8		0.224		10.5	LOS B	0.8	5.9				
North: Sir Leslie Thiess Drive													
Lane 1	506	10.3	1730	0.293	100	4.7	LOS A	0.0	0.0	Full	70	0.0	0.0
Lane 2	506	10.3	1730	0.293	100	4.7	LOS A	0.0	0.0	Full	70	0.0	0.0
Approach	1012	10.3		0.293		4.7	NA	0.0	0.0				
West: The Strand (W)													
Lane 1	1245	9.4	1562	0.797	100	5.7	LOS A	12.9	97.2	Full	500	0.0	0.0
Lane 2	171	4.9	426	0.400	100	14.5	LOS B	1.7	12.2	Full	500	0.0	0.0
Approach	1416	8.9		0.797		6.8	LOS A	12.9	97.2				
Intersection	2647	9.1		0.797		6.3	NA	12.9	97.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE GRAPHS - Demand (Flow Scale) Analysis

Average control delay per vehicle for the worst vehicle movement (seconds) and Highest degree of saturation in any lane

▽ Site: 102 [Opt4 AM T-Int Strand/SLTD - Sensitivity]

Option 4

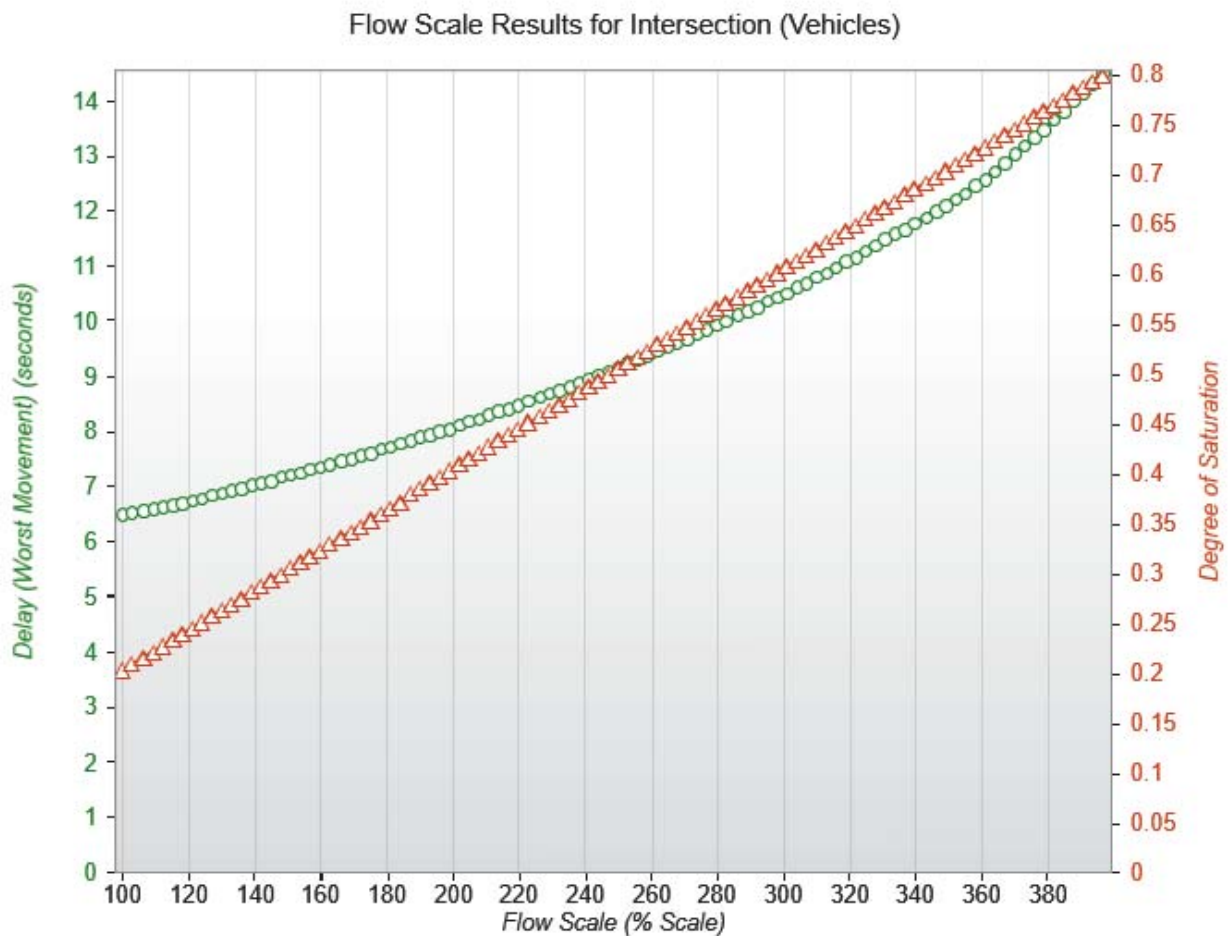
T-Intersection - The Strand / Sir Leslie Thiess Drive

With Development Morning Peak Hour Traffic Volumes

Site Category: (None)

Giveaway / Yield (Two-Way)

Flow Scale Analysis (Level of Service Target (Worst Vehicle Movement)): Results for Flow Scale (chosen as largest for any movement) = 397.0 %



LANE SUMMARY

▽ Site: 102 [Opt4 PM T-Int Strand/SLTD - Sensitivity]

Option 4

T-Intersection - The Strand / Sir Leslie Thiess Drive

With Development Evening Peak Hour Traffic Volumes

Site Category: (None)

Giveaway / Yield (Two-Way)

Flow Scale Analysis (Level of Service Target (Worst Vehicle Movement)): Results for Flow Scale (chosen as largest for any movement) = 283.0 %

Lane Use and Performance													
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
								Veh	Dist m				
East: The Strand (E)													
Lane 1	85	4.9	305	0.279	100	16.3	LOS C	1.0	7.1	Full	70	0.0	0.0
Lane 2	85	4.9	305	0.279	100	16.3	LOS C	1.0	7.1	Full	70	0.0	0.0
Lane 3	1	0.0	168	0.006	100	23.1	LOS C	0.0	0.1	Full	70	0.0	0.0
Approach	172	4.9		0.279		16.4	LOS C	1.0	7.1				
North: Sir Leslie Thiess Drive													
Lane 1	672	6.4	1776	0.379	100	4.7	LOS A	0.0	0.0	Full	70	0.0	0.0
Lane 2	672	6.4	1776	0.379	100	4.7	LOS A	0.0	0.0	Full	70	0.0	0.0
Approach	1345	6.4		0.379		4.7	NA	0.0	0.0				
West: The Strand (W)													
Lane 1	602	8.4	1569	0.384	100	5.7	LOS A	2.3	17.2	Full	500	0.0	0.0
Lane 2	218	4.8	273	0.799	100	34.6	LOS D	4.6	33.5	Full	500	0.0	0.0
Approach	820	7.5		0.799		13.4	LOS B	4.6	33.5				
Intersection	2336	6.7		0.799		8.6	NA	4.6	33.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE GRAPHS - Demand (Flow Scale) Analysis

Average control delay per vehicle for the worst vehicle movement (seconds) and Highest degree of saturation in any lane

▽ Site: 102 [Opt4 PM T-Int Strand/SLTD - Sensitivity]

Option 4

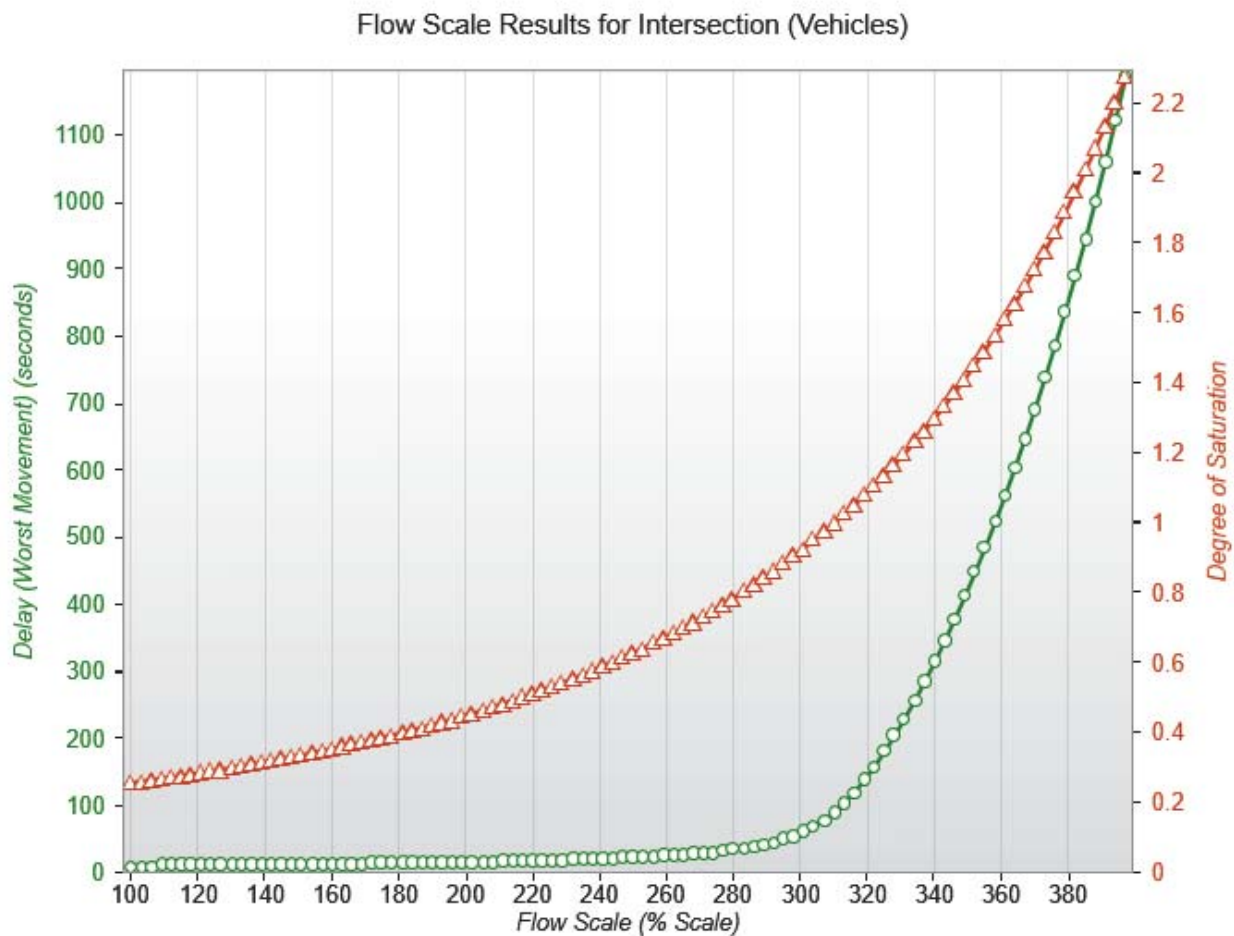
T-Intersection - The Strand / Sir Leslie Thiess Drive

With Development Evening Peak Hour Traffic Volumes

Site Category: (None)

Giveaway / Yield (Two-Way)

Flow Scale Analysis (Level of Service Target (Worst Vehicle Movement)): Results for Flow Scale (chosen as largest for any movement) = 283.0 %



LANE SUMMARY

▽ Site: 101 [Opt 5 AM Priority Intersection - Sensitivity]

Priority intersection (option 5) replacing the proposed roundabout (option 4)

With morning peak hour traffic volumes and sensitivity testing

Site Category: (None)

Giveaway / Yield (Two-Way)

Flow Scale Analysis (Level of Service Target (Worst Vehicle Movement)): Results for Flow Scale (chosen as largest for any movement) = 241.0 %

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Sir Leslie Thiess Drive (S)													
Lane 1	387	13.7	1772	0.219	100	0.1	LOS A	0.0	0.0	Full	20	0.0	0.0
Lane 2	202	5.2	981	0.206	100	4.4	LOS A	0.9	6.5	Short	18	0.0	NA
Approach	590	10.8		0.219		1.6	NA	0.9	6.5				
East: Proposed Road													
Lane 1	204	5.2	1056	0.193	100	4.9	LOS A	0.8	5.7	Full	50	0.0	0.0
Approach	204	5.2		0.193		4.9	LOS A	0.8	5.7				
North: Sir Leslie Thiess Drive (N)													
Lane 1	154	27.0	1659	0.093	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	175	5.2	1879	0.093	100	0.1	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	329	15.4		0.093		0.1	NA	0.0	0.1				
West: Breakwater Access													
Lane 1	25	4.2	126	0.200	100	32.8	LOS D	0.6	4.6	Full	25	0.0	0.0
Approach	25	4.2		0.200		32.8	LOS D	0.6	4.6				
Intersection	1148	11.0		0.219		2.4	NA	0.9	6.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE GRAPHS - Demand (Flow Scale) Analysis

Average control delay per vehicle for the worst vehicle movement (seconds) and Highest degree of saturation in any lane

▽ Site: 101 [Opt 5 AM Priority Intersection - Sensitivity]

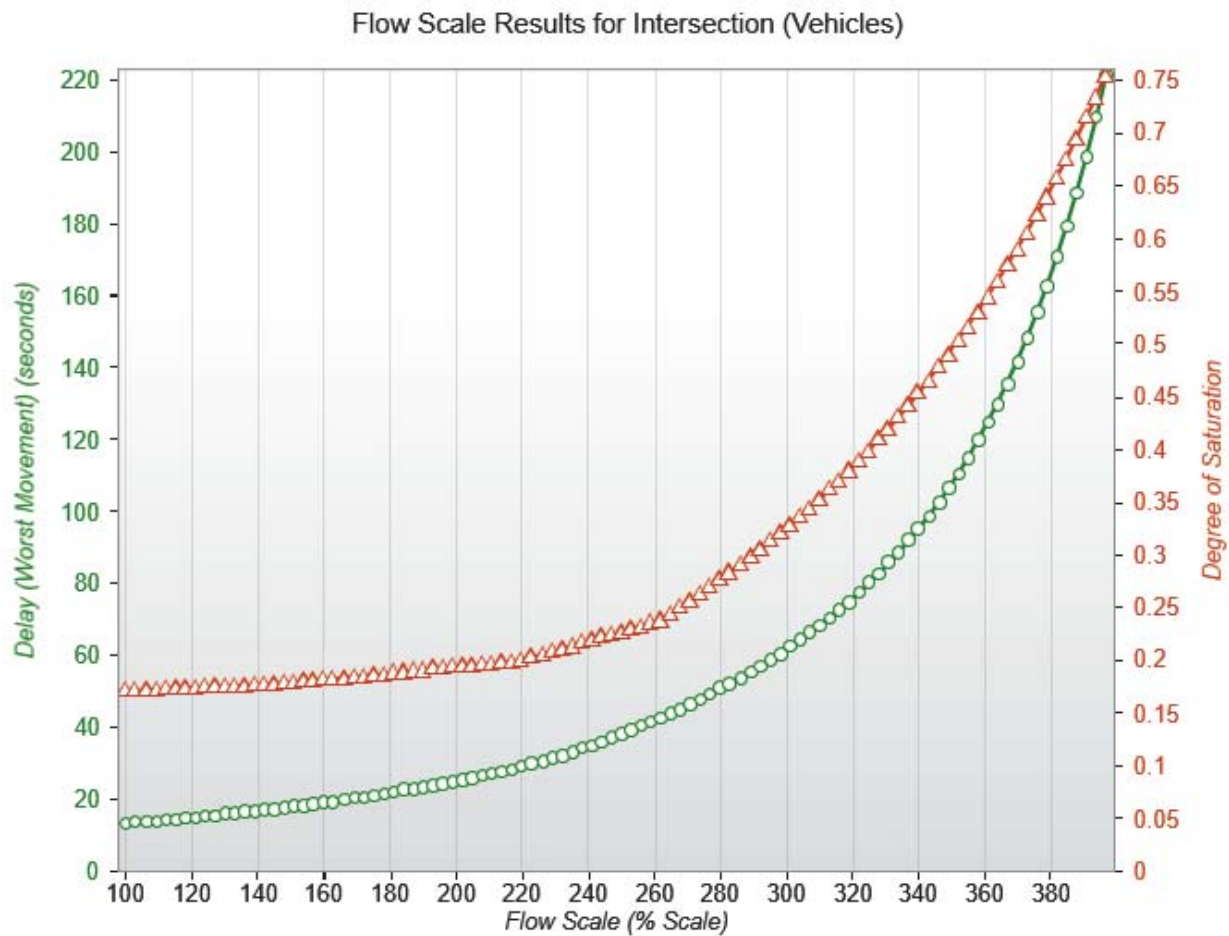
Priority intersection (option 5) replacing the proposed roundabout (option 4)

With morning peak hour traffic volumes and sensitivity testing

Site Category: (None)

Giveaway / Yield (Two-Way)

Flow Scale Analysis (Level of Service Target (Worst Vehicle Movement)): Results for Flow Scale (chosen as largest for any movement) = 241.0 %



LANE SUMMARY

▽ Site: 101 [Opt 5 PM Priority Intersection - Sensitivity]

Priority intersection (option 5) replacing the proposed roundabout (option 4)

With evening peak hour traffic volumes and sensitivity testing

Site Category: (None)

Giveaway / Yield (Two-Way)

Flow Scale Analysis (Level of Service Target (Worst Vehicle Movement)): Results for Flow Scale (chosen as largest for any movement) = 289.0 %

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Sir Leslie Thiess Drive (S)													
Lane 1	394	10.3	1812	0.218	100	0.2	LOS A	0.0	0.0	Full	20	0.0	0.0
Lane 2	196	4.8	877	0.223	100	5.1	LOS A	0.9	6.9	Short	18	0.0	NA
Approach	590	8.5		0.223		1.8	NA	0.9	6.9				
East: Proposed Road													
Lane 1	192	4.9	994	0.193	100	5.3	LOS A	0.8	5.6	Full	50	0.0	0.0
Approach	192	4.9		0.193		5.3	LOS A	0.8	5.6				
North: Sir Leslie Thiess Drive (N)													
Lane 1	211	14.7	1779	0.119	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	223	5.2	1881	0.119	100	0.0	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	434	9.8		0.119		0.0	NA	0.0	0.1				
West: Breakwater Access													
Lane 1	12	0.0	126	0.092	100	30.5	LOS D	0.3	2.0	Full	25	0.0	0.0
Approach	12	0.0		0.092		30.5	LOS D	0.3	2.0				
Intersection	1227	8.3		0.223		2.0	NA	0.9	6.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE GRAPHS - Demand (Flow Scale) Analysis

Average control delay per vehicle for the worst vehicle movement (seconds) and Highest degree of saturation in any lane

▽ Site: 101 [Opt 5 PM Priority Intersection - Sensitivity]

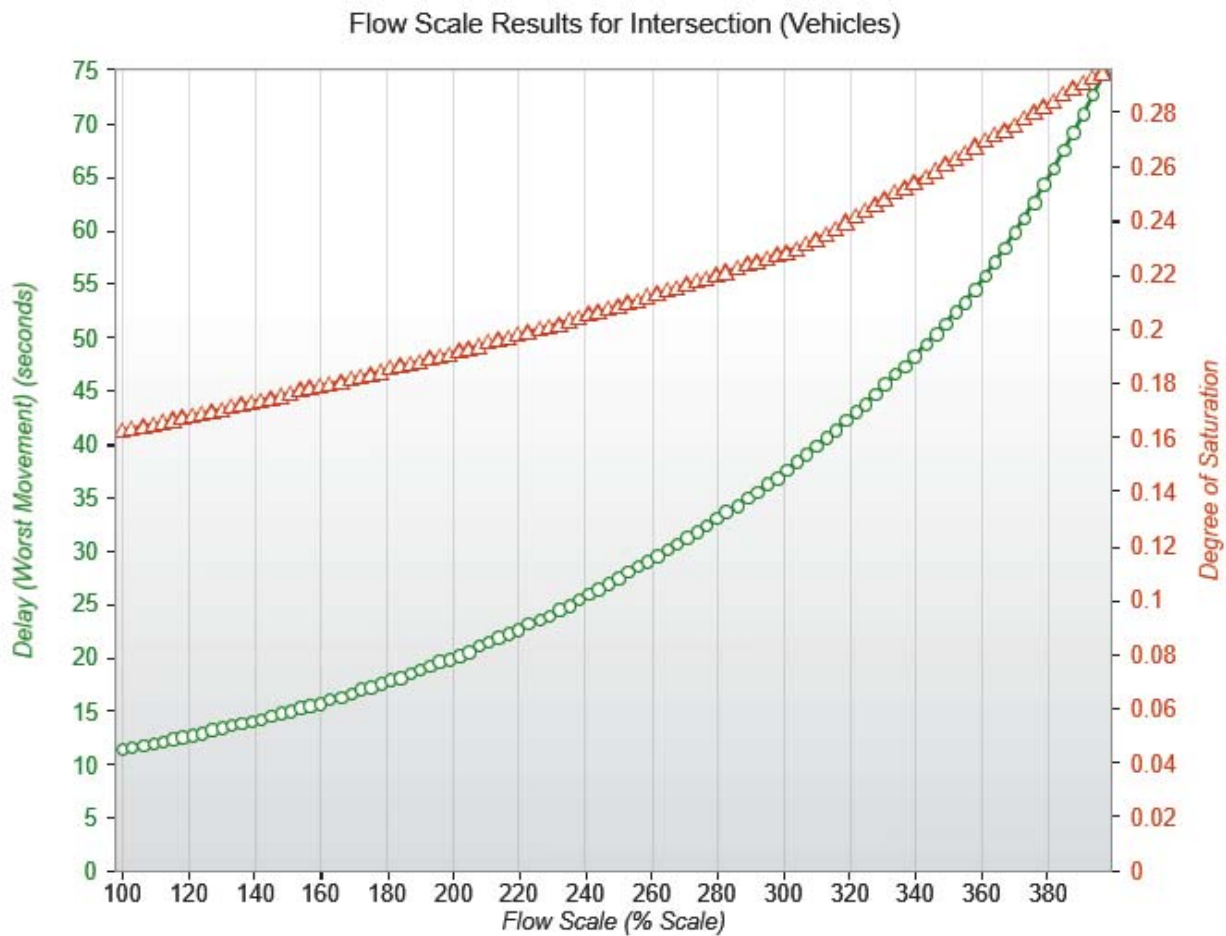
Priority intersection (option 5) replacing the proposed roundabout (option 4)

With evening peak hour traffic volumes and sensitivity testing

Site Category: (None)

Giveaway / Yield (Two-Way)

Flow Scale Analysis (Level of Service Target (Worst Vehicle Movement)): Results for Flow Scale (chosen as largest for any movement) = 289.0 %



LANE SUMMARY

▽ Site: 101 [Opt4 AM SLTD East Access - Sensitivity]

Option 4

Sir Leslie Thiess Drive Eastern Access to the Development

With Development Morning Peak Hour Traffic Volumes and sensitivity testing

Site Category: (None)

Giveaway / Yield (Two-Way)

Flow Scale Analysis (Level of Service Target (Worst Vehicle Movement)): Results for Flow Scale (chosen as largest for any movement) = 397.0 %

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
	Total	HV						Veh	Dist m				
	veh/h	%											
East: Development Access													
Lane 1	28	3.7	1100	0.026	100	4.3	LOS A	0.1	0.7	Full	25	0.0	0.0
Approach	28	3.7		0.026		4.3	LOS A	0.1	0.7				
North: Sir Leslie Thiess Drive (N)													
Lane 1	496	16.1	1742	0.285	100	1.4	LOS A	0.0	0.0	Full	80	0.0	0.0
Lane 2	538	5.0	1889	0.285	100	0.0	LOS A	0.0	0.0	Full	80	0.0	0.0
Approach	1033	10.3		0.285		0.7	NA	0.0	0.0				
Intersection	1062	10.1		0.285		0.8	NA	0.1	0.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE GRAPHS - Demand (Flow Scale) Analysis

Average control delay per vehicle for the worst vehicle movement (seconds) and Highest degree of saturation in any lane

▽ Site: 101 [Opt4 AM SLTD East Access - Sensitivity]

Option 4

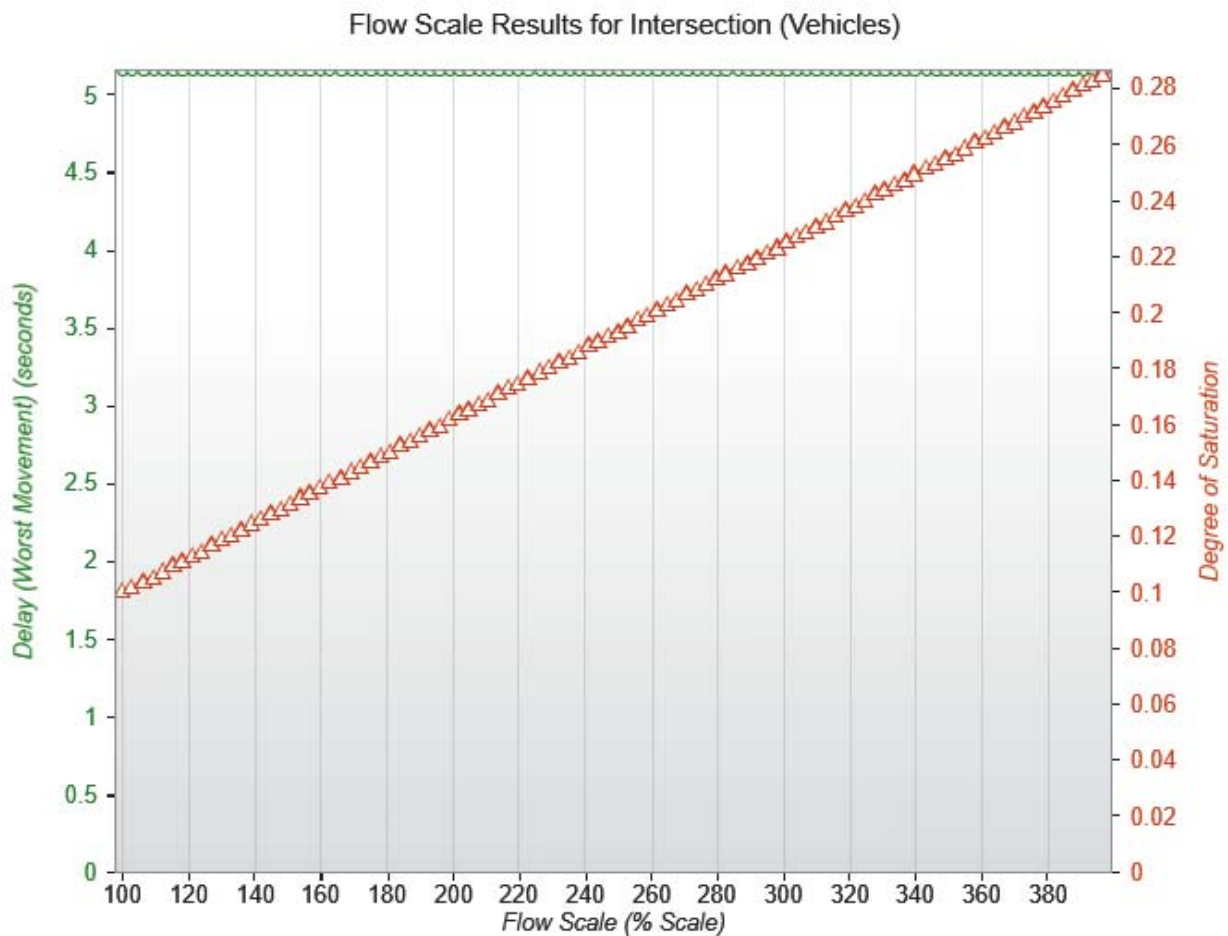
Sir Leslie Thiess Drive Eastern Access to the Development

With Development Morning Peak Hour Traffic Volumes and sensitivity testing

Site Category: (None)

Giveaway / Yield (Two-Way)

Flow Scale Analysis (Level of Service Target (Worst Vehicle Movement)): Results for Flow Scale (chosen as largest for any movement) = 397.0 %



LANE SUMMARY

▽ Site: 101 [Opt4 PM SLTD East Access - Sensitivity]

Option 4

Sir Leslie Thiess Drive Eastern Access to the Development

With Development Evening Peak Hour Traffic Volumes and sensitivity testing

Site Category: (None)

Giveaway / Yield (Two-Way)

Flow Scale Analysis (Level of Service Target (Worst Vehicle Movement)): Results for Flow Scale (chosen as largest for any movement) = 397.0 %

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
East: Development Access													
Lane 1	172	4.9	855	0.201	100	5.9	LOS A	0.8	5.9	Full	25	0.0	0.0
Approach	172	4.9		0.201		5.9	LOS A	0.8	5.9				
North: Sir Leslie Thiess Drive (N)													
Lane 1	615	9.5	1830	0.336	100	0.4	LOS A	0.0	0.0	Full	80	0.0	0.0
Lane 2	634	5.0	1889	0.336	100	0.0	LOS A	0.0	0.0	Full	80	0.0	0.0
Approach	1249	7.2		0.336		0.2	NA	0.0	0.0				
Intersection	1420	6.9		0.336		0.9	NA	0.8	5.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

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Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE GRAPHS - Demand (Flow Scale) Analysis

Average control delay per vehicle for the worst vehicle movement (seconds) and Highest degree of saturation in any lane

▽ Site: 101 [Opt4 PM SLTD East Access - Sensitivity]

Option 4

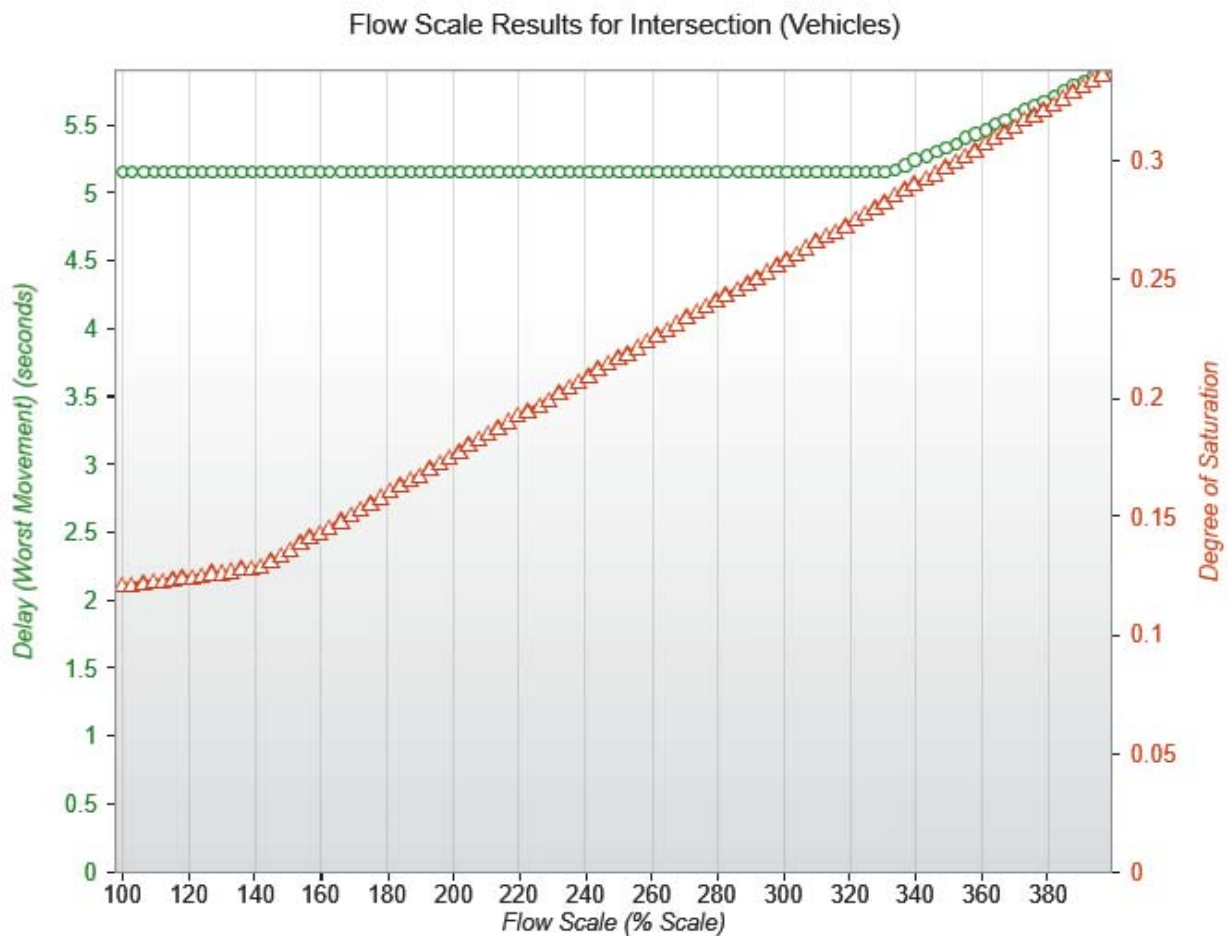
Sir Leslie Thiess Drive Eastern Access to the Development

With Development Evening Peak Hour Traffic Volumes and sensitivity testing

Site Category: (None)

Giveaway / Yield (Two-Way)

Flow Scale Analysis (Level of Service Target (Worst Vehicle Movement)): Results for Flow Scale (chosen as largest for any movement) = 397.0 %



APPENDIX J
TRAFFIC IMPACT ASSESSMENT CERTIFICATION

CERTIFICATION OF TRAFFIC IMPACT ASSESSMENT REPORT
REGISTERED PROFESSIONAL ENGINEER QUEENSLAND
FOR

Project Title	Townsville Marine Tourism Precinct – Ferry Terminal Traffic and Transport Impact Assessment
----------------------	--

As a professional engineer registered by the Board of Professional Engineers of Queensland pursuant to the *Professional Engineers Act 2002* as competent in my areas of nominated expertise, I understand and recognise:

- The significant role of engineering as a profession; and that
- The community has a legitimate expectation that my certification affixed to this engineering work can be trusted; and that
- I am responsible for ensuring its preparation has satisfied all necessary standards, conduct and contemporary practice.

As the responsible RPEQ, I certify:

- I am satisfied that all submitted components comprising this traffic impact assessment, listed in the following table, have been completed in accordance with the Guide to Traffic Impact Assessment published by the Queensland Department of Transport and Main Roads and using sound engineering principles; and
- Where specialised areas of work have not been under my direct supervision, I have reviewed the outcomes of the work and consider the work and its outcomes as suitable for the purposes of this traffic impact assessment; and that
- The outcomes of this traffic impact assessment are a true reflection of results of assessment; and that
- I believe the strategies recommended for mitigating impacts by this traffic impact assessment, embrace contemporary practice initiatives and will deliver the desired outcomes.

Name	Bradley Jones
RPEQ No.	19986
RPEQ Competencies	Civil
Email	Bradley.Jones@premise.com.au
Postal Address	PO Box 1110 TOWNSVILLE QLD 4810
Signature	
Date	17 April 2019

Traffic impact assessment components to which this certification applies	☒
1. Introduction	
Background	☐
Scope and study area	☒
Pre-lodgement meeting notes	☒
2. Existing Conditions	
Land use and zoning	☒
Adjacent land uses / approvals	☒
Surrounding road network details	☒
Traffic volumes	☒
Intersection and network performance	☒
Road safety issues	☐
Site access	☒
Public transport (if applicable)	☒
Active transport (if applicable)	☒
Parking (if applicable)	☐
Pavement (if applicable)	☐
Transport infrastructure (if applicable)	☐
3. Proposed Development Details	
Development site plan	☒
Operational details (including year of opening each stage and any relevant catchment / market analysis)	☒
Proposed access and parking	☒
4. Development Traffic	
Traffic generation (by development stage if relevant and considering light and heavy vehicle trips)	☒
Trip distribution	☒
Development traffic volumes on the network	☒
5. Impact Assessment and Mitigation	
With and without development traffic volumes	☒
Construction traffic impact assessment and mitigation (if applicable)	☐
Road safety impact assessment and mitigation	☒
Access and frontage impact assessment and mitigation	☒
Intersection delay impact capacity assessment and mitigation	☒
Road link capacity assessment and mitigation	☐
Pavement impact assessment and mitigation	☐
Transport infrastructure impact assessment and mitigation	☐
Other impacts assessment	☒
- public transport	
- pathways	
6. Conclusions and Recommendations	
Summary of impacts and mitigation measures proposed	☒
Certification statement and authorisation	☒



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ENGINEERING



ENVIRONMENT



AGRICULTURE



WATER

ANNEXURE E
DESK-TOP EXTERNAL ROAD NETWORK IMPACT ASSESSMENT
(17 APRIL 2019)

17 April 2019

The Manager
Honeycombes Property Group
281 Sturt Street
TOWNSVILLE QLD 4810

Attention: Mr Peter Honeycombe

Dear Sir

**TOWNSVILLE MARINE TOURISM PRECINCT – FERRY TERMINAL
DESK-TOP EXTERNAL ROAD NETWORK IMPACT ASSESSMENT**

In response to the Recommended Scope for Reporting: Transport Infrastructure Assessment provided by the Department of State Development, Manufacturing, Infrastructure and Planning on 21 December 2018, we provide the following advice. This advice is supplementary to our “Townsville Marine Tourism Precinct – Ferry Terminal: Traffic and Transport Impact Assessment” report (HON0031-R01-revB) dated 17 April 2019.

EXISTING CONDITIONS

The development site is located on the west bank of Ross Creek near its mouth. As such, land access to the site is limited to the west through the King Street Quarter.

The King Street Quarter road network consists of King Street, Flinders Street, Wickham Street and the Strand. These roads currently operate as a one-way clockwise loop, however, the Negotiated Decision Notice for Preliminary Approval of the Hive Structure / Precinct Plan dated 11 December 2018 conditions works to allow two way vehicle movements on these roads prior to the cumulative Gross Floor Area (GFA) for the Hive development exceeding 60,000m².

From the King Street Quarter, Flinders Street extends west along the east bank of Ross Creek to Townsville’s Principle Centre (CBD) and the Strand continues northwest along the coast.

The nearest arterial road to the development site is North Ward Road under the governing authority of the Department of Transport and Main Roads (TMR). North Ward Road follows a curved alignment from Boundary Street southeast of Castle Hill, through North Ward to the north of Castle Hill to Woolcock Street southwest of Castle Hill. North Ward Road is known more commonly by a range of names along its length including Dean Street, Denham Street, Oxley Street, Eyre Street and Warburton Street. Traffic travelling between the development site and the broader Townsville area must travel along or across North Ward Road.

Flinders Street connects directly to North Ward Road on the section known as Denham Street at a four-way signalised intersection.

The Strand is generally aligned parallel to North Ward Road with a number of streets providing cross connectivity between the two (2) roads. Of these, the links considered most relevant to the development site are:

- Melton Terrace operating one-way from Denham Street to the Strand with all-movement priority T-intersections at both ends;
- Oxley Street operating two-way with roundabout control of three-way intersections on both Eyre Street and the Strand; and
- Gregory Street operating two-way with roundabout control of the Strand T-intersection and traffic signal control of the Eyre Street crossroads.

A number of traffic studies have previously been prepared in relation to the road network connecting the development site to North Ward Road. The following reports have been reviewed to produce the advice contained in this letter:

- “Breakwater & Associated Developments: Assessment of Peak Hour Traffic Volumes” (TCC Breakwater report) dated 11 December 2007 by C & G Horman Pty Ltd for Townsville City Council (TCC); and
- “The Hive Preliminary Master Plan: Traffic Impact Assessment” (Hive TIA) dated 9 November 2016 by ARUP for Griffin Group.

PROPOSED DEVELOPMENT DETAILS

Development Application drawings dated 20 February 2019 by Counterpoint Architecture show the proposed development consisting of:

- 1,345m² ferry terminal and bus hub including waiting areas, ferry operator offices and workshop;
- 99 room hotel with 306m² restaurant/bar;
- 474m² commercial tenancy;
- 506m² research & educational facility;
- 682m² of retail across two (2) tenancies; and
- 461 space multi-level car park plus coach / taxi zones.

DEVELOPMENT TRAFFIC

The traffic profile of the proposed development was calculated in HON0031-R01-revB and is summarised by Table 1. The assessment conservatively assumed that the research & education facility would generate traffic at the same rate as a commercial tenancy. Cross-utilisation is based on 30% of trips generated by the restaurant, commercial tenancy (including the research & education facility) and retail being internal to the development, e.g. retail staff commuting via the ferry terminal / bus hub, hotel guests utilising the hotel restaurant.

Table 1: Proposed Development External Traffic Generation

Traffic Generation	Morning Peak Hour (vph)			Evening Peak Hour (vph)		
	In	Out	Total	In	Out	Total
Buses	14	14	28	7	7	14
Light Vehicles	268	172	440	197	317	514
Total Traffic Generation	282	186	468	204	324	528
Cross-Utilisation	0	-4	-4	-10	-11	-21
External Traffic Generation	282	182	464	194	313	507

IMPACT ASSESSMENT AND MITIGATION

Review of the TCC Breakwater Report

The TCC Breakwater report examined peak hour traffic volumes and road network requirements for developments proposed in 2007 for the Breakwater Area. These developments included but were not limited to:

- 8,000m² GFA of commercial / retail and 250 casual accommodation units on the Townsville Marine Tourism Precinct site;
- Relocation of the SeaLink ferry terminal from the west bank of Ross Creek to the east bank;
- 18,500m² GFA of commercial / restaurant on the Hive site; and
- A 30Ha Future Development Area (FDA) to be reclaimed from Cleveland Bay north of The Ville Resort.

The proposed Townsville Marine Tourism Precinct ferry terminal development excluding the ferry terminal and bus hub is less than a third of the size of the development yield assumed by the TCC Breakwater report for the corresponding site. The Townsville Marine Tourism Precinct site traffic generation estimated by the TCC Breakwater report is summarised by Table 2. With relocation of the ferry terminal from the west bank of Ross Creek to the east bank, the net increase in traffic generated by the site as estimated in the TCC Breakwater report is less than that estimated by HON0031-R01-revB, particularly during the morning peak hour.

Table 2: Townsville Marine Tourism Precinct Site Traffic Generation from the TCC Breakwater Report

Traffic Generation	Morning Peak Hour (vph)			Evening Peak Hour (vph)		
	In	Out	Total	In	Out	Total
Commercial / retail	80	0	80	160	240	400
Casual accommodation	30	70	100	70	30	100
Total Traffic Generation	110	70	180	230	270	500
Existing Traffic Generation	-105	-45	-150	-45	-105	-150
Net Traffic Generation	5	25	30	185	165	350

The TCC Breakwater report considered three (3) traffic scenarios being one (1) scenario excluding development of the FDA and two (2) scenarios including development of the FDA and construction of a new bridge across Ross Creek. The “No FDA” scenario is considered most relevant to assessment of the proposed Townsville Marine Tourism Precinct ferry terminal.

To accommodate peak hour traffic in the “No FDA” scenario, the TCC Breakwater report recommended:

- Removal of the Flinders Street / Wickham Street / Strand / King Street one-way system; and
- Upgrading of McIlwraith Street intersections (to accommodate development on the east bank of Ross Creek including the relocated ferry terminal).

The TCC Breakwater report also identified that even with these upgrades there would be increased congestion in the CBD, particularly at the Flinders Street / Denham Street intersection, and reduced amenity on Melton Terrace, Cleveland Terrace and the Strand. Congestion at the Flinders Street / Denham Street intersection was predicted to result in diversion of traffic to other routes in the CBD such as Sturt Street, Walker Street, Ogden Street and Stanley Street.

When the TCC Breakwater report was prepared in late 2007, Flinders Street between Denham Street and Stanley Street was a pedestrian mall and TCC was seeking funding to redevelop the mall and possibly reopen it to traffic. The TCC Breakwater report predicted that reopening of the mall to traffic would both increase traffic demand at the Flinders Street / Denham Street intersection and also reduce the efficiency of the traffic signals. The report went on to indicate that this would exacerbate congestion at the intersection and upgrading of the intersection would not mitigate congestion as any increase in intersection capacity would be taken up by latent travel demand.

The TCC Breakwater report also reviewed the capacity of the Oxley Street link between the Strand and North Ward Road, and concluded that no upgrading of the roundabouts at either end of this link was required to accommodate development of the Breakwater Area.

Review of the Hive TIA

The Hive TIA indicates that the Hive “will be developed over multiple stages from 2018 to 2025” with an overall development yield as follows:

- Gallery – 5,537m² GFA;
- Library – 6,310m² GFA;
- Concert Hall – 835 seats;
- Residential – 102 units;
- Commercial – 9,041m² GFA;
- Function Room – 951m² GFA;
- Food and Beverage – 2,242m² GFA;
- Hotel – 125 rooms;
- Research and Tech Industry – 3,390m² GFA;
- Health Care Services – 2,056m² GFA;
- Retail – 806m² GFA; and
- Educational Establishment – 2,227m² GFA.

The Negotiated Decision Notice for Preliminary Approval of the Hive Structure / Precinct Plan conditions a total of 850 car parks for the entire development on the basis there is a mix of uses.

The development yield of the Hive assumed in the Hive TIA is more than double that assumed by the TCC Breakwater report for the corresponding site.

The traffic profile of the Hive as calculated by ARUP is summarised by Table 3. ARUP adopted a cross-utilisation rate of 30% for all non-residential land uses to allow for multi-purpose trips, e.g. visitors to the Concert Hall also getting some dinner at the Hive. ARUP also deducted the estimated traffic generation of existing development on site being:

- The Queens Hotel – 4,782m² GFA office;
- The Criterion Hotel – 635m² GFA club;
- Avis – 180m² GFA shop;
- Other retail – 111m² GFA shop
- Lilac Court – eight (8) residential units;

Table 3: The Hive External Traffic Generation from the Hive TIA

Traffic Generation	Morning Peak Hour (vph)			Evening Peak Hour (vph)		
	In	Out	Total	In	Out	Total
Residential (incl. Hotel)	18	72	90	66	17	83
Non-residential	500	269	771	405	442	848
Total Traffic Generation	518	341	858	472	459	930
Cross-Utilisation	-153	-93	-245	-114	-136	-250
External Traffic Generation	365	248	613	358	323	680
Existing Traffic Generation	-83	-27	-109	-71	-127	-197
Net External Traffic	282	221	503	287	196	483

The Townsville Marine Tourism Precinct ferry terminal external traffic generation estimated in HON0031-R01-revB and summarised by Table 1 is based on more conservative assumptions than the Hive external traffic generation estimated by ARUP in the Hive TIA and summarised by Table 3. If the external traffic generation of the Townsville Marine Tourism Precinct ferry terminal were estimated using the same assumptions as the Hive, the two-way peak hour traffic generation of the Townsville Marine Tourism Precinct ferry terminal would be at least 136vph less than indicated in Table 1.

The following points are noted from the Hive TIA as being potentially relevant to the Townsville Marine Tourism Precinct ferry terminal development:

- When the the Hive TIA was prepared in 2016, upgrading of the one-way network (in the King Street Quarter) to two-way was planned by TCC to occur by 2036 but the proposed development intended to bring forward this planned change to 2018. The Hive's opening year;
- The assessment of the Denham Street / Sturt Street intersection was completed assuming an upgraded intersection layout with widening of Sturt Street to two (2) lanes in each direction by 2021; and

- Analysis indicated that the Flinders Street / Denham Street intersection would operate at the limit of acceptable operation during the evening peak hour at the opening year (2018) even in the absence of the proposed development (the Hive). The Flinders Street / Denham Street intersection is located within a constrained site and this greatly reduces the land available to provide infrastructure improvements at the intersection. Therefore, ARUP considered a strategic network upgrade would be required to achieve no worsening of the operation of the Flinders Street / Denham Street intersection. The strategic network upgrade identified in the Hive TIA is banning of right turns in and out of Flinders Street west at the Denham Street intersection and redirection of these movements via Sturt Street and Stokes Street.

Notwithstanding the above points, the Negotiated Decision Notice dated 11 December 2018 by TCC and Concurrence Agency Response dated 21 July 2017 by the Department of Infrastructure, Local Government and Planning for Preliminary Approval of the Hive Structure / Precinct Plan conditions only works to allow two way vehicle movements on King Street, Wickham Street and the Strand. These are frontage works and are conditioned to occur at a later development stage than assumed by ARUP.

The Hive TIA and conditions of approval are consistent with the TCC Breakwater report in that:

- Conversion of the Flinders Street / Wickham Street / Strand / King Street one-way system to two-way operation is recommended; and
- Congestion at the Flinders Street / Denham Street intersection is expected to increase with no real option to mitigate the impact resulting in diversion of traffic to other routes through the CBD.

Townsville Marine Tourism Precinct Ferry Terminal Implied Road Network Impacts

Based on both the TCC Breakwater report and the Hive TIA, the one-way loop consisting of King Street, Flinders Street, Wickham Street and the Strand should be converted to two-way operation to improve the efficiency of traffic flows with the proposed Townsville Marine Tourism Precinct ferry terminal.

In the Hive TIA, ARUP recommended that conversion of the one-way loop to two-way operation be carried out prior to the opening of the Hive. However, the Negotiated Decision Notice for Preliminary Approval of the Hive Structure / Precinct Plan dated 11 December 2018 allows these works to be deferred until the cumulative GFA of the Hive reaches 60,000m². The Townsville Marine Tourism Precinct ferry terminal is a much smaller development than the Hive with a total GFA of just 8,399m² and will not on its own reach the 60,000m² GFA trigger referred to above for removal of the one-way loop.

On the basis of estimated 2018 traffic, the Hive TIA concluded that the Flinders Street / Denham Street intersection is currently operating at the limit of acceptable operation during the evening peak hour. The Hive TIA implies that, to ensure no net worsening of network performance:

- Sturt Street should be widened to two (2) lanes in each direction; and
- Right turns in and out of Flinders Street west at the Denham Street intersection should be banned.

The Hive has not been conditioned to provide these upgrades implying that TCC and TMR have accepted the advice of the TCC Breakwater report and the Hive TIA that:

- Congestion in the CBD is going to increase; and
- Given the constrained environment, it is not practical to expand the road network to cater for unconstrained demand.

CONCLUSIONS AND RECOMMENDATIONS

Previous traffic studies in relation to the road network connecting the Townsville Marine Tourism Precinct ferry terminal to the arterial road network indicate that:

- At least one intersection in the Townsville Principle Centre (CBD) is already operating at the limit of acceptable operation;
- Congestion in the CBD is going to increase; and
- It is not practical to expand the road network to cater for unconstrained demand.

Conditions of approval for the Hive, a larger development than the proposed Townsville Marine Tourism Precinct ferry terminal, imply acceptance of the above points by TCC and TMR.

For consistency with conditions of approval for the Hive development, the Townsville Marine Tourism Precinct ferry terminal should be approved with the only traffic / transport upgrades required being limited to the frontage of the development site.

If you have any queries in relation to the above, please contact Mr Bradley Jones on (07) 4772 0666.

Yours faithfully



Bradley Jones (RPEQ No 19986)
Senior Traffic Engineer
Premise

Cc: Mr George Milford, Milford Planning Consultants

ANNEXURE F
RESPONSE TO DEV2019/1027 “MEDQ INFORMATION REQUEST
AND NOTIFICATION NOT REQUIRED COPY”
(25 JUNE 2019)

Our Ref: HON0031-L03-JTP

Contact: Bradley Jones

25 June 2019

The Manager
Honeycombes Property Group
281 Sturt Street
TOWNSVILLE QLD 4810

Attention: Mr Peter Honeycombe

Dear Peter

**TOWNSVILLE MARINE TOURISM PRECINCT - FERRY TERMINAL
RESPONSE TO DEV2019/1027 "MEDQ INFORMATION REQUEST AND NOTIFICATION NOT
REQUIRED COPY"**

We have reviewed the "Information Request and Notification not required copy" from the Minister for Economic Development Queensland (MEDQ) dated 18 June 2019 with reference DEV2019/1027. This Information Request states that MEDQ requires provision of a revised Traffic and Transport Impact Assessment that:

- i. Is based on:
 - a. Recent trip generation information; or
 - b. New traffic counts;
- ii. Contains forecasting that gives consideration to Council's Townsville Aimsun Integrated Model (TAIM), which forecasts anticipated development growth within the PDA

The Information Request notes that:

The Traffic and Transport Impact Assessment Report Number HON0031/R01 Rev.B dated 17 April 2019, prepared by Premise, is based on data obtained from a document Breakwater and Associated Development: Assessment of Peak Hour Traffic Volumes (TCC Breakwater Report) prepared by C&G Horman Pty Ltd for Council dated 11 December 2007. This data is more than 10 years old.

On 24 June 2019, Townsville City Council (TCC) supplied the following information referred to in the information request:

- Traffic count for Sir Leslie Thiess Drive taken in April 2016:
 - SG21_Sir Leslie Thiess Drive (North of Sunferries) _13Apr16-25Apr16.xlsm;
- Sealink (formerly Sun Ferries) carpark traffic counts:
 - SG12_Sunferries – Long Distance Bus (NB carpark) _13Apr16-25Apr16.xlsm; and
 - SG12_Sunferries – Long Distance Bus (SB carpark) _13Apr16-25Apr16.xlsm; and

- Screenshots taken from the Townsville Aimsun Integrated Model (TAIM) for the projected timeframes. These screenshots assume no new Ferry Terminal and no Hive Development:
 - TAIM Screenshot – 2021 AADT – Eastern Strand – No Hive Development or new Ferry Terminal.png;
 - TAIM Screenshot – 2026 AADT – Eastern Strand – No Hive Development or new Ferry Terminal.png;
 - TAIM Screenshot – 2031 AADT – Eastern Strand – No Hive Development or new Ferry Terminal.png; and
 - TAIM Screenshot – 2036 AADT – Eastern Strand – No Hive Development or new Ferry Terminal.png.

In response to the Information Request we provide the following clarification, literature review and review of Townsville City Council (TCC) data.

Clarification

The method of projection used for traffic forecasting in the Premise Traffic and Transport Impact Assessment dated 17 April 2019 was not based on traffic counts but based on land use.

The study area for the Traffic and Transport Impact Assessment was the geometric frontage of the site on Sir Leslie Thiess Drive and the Strand including the Strand / Sir Leslie Thiess Drive intersection. This study area is located within a closed catchment where the only point of entry / exit is the Strand / King Street intersection as shown by Figure 1 reproduced from the Traffic and Transport Impact Assessment.



Figure 1: Land uses within the closed Strand / Sir Leslie Thiess Drive catchment (reproduced from Traffic and Transport Impact Assessment, 17 April 2019)

As the land use catchment is closed, through traffic is excluded from the study area and traffic forecasting based on land use is an acceptable alternative to traffic forecasting based on traffic counts.

Land use and not traffic counts is the basis of all traffic forecasts prepared by gravity models such as:

- AIMSUN software, the platform upon which Council's TAIM is based; and
- EMME software, the platform upon which the Townsville Strategic Transport Model (TSTM) is based. (TSTM was the traffic model used by Council prior to development of the TAIM.)

Literature Review

Below is an extract from Section 8.2.1 Determining Peak and Daily Traffic Generation Rates of the "Guide to Traffic Impact Assessment" (GTIA) (Transport and Main Roads, December 2018):

The preferred hierarchy of data sources for traffic generation rates is:

1. *Traffic generation survey of an existing development similar to the proposed development in terms of its land use, scale, location and so on*
2. *Traffic generation data – 2006-2017 (Queensland) Open Data*
3. *Guide to Traffic Generating Developments Updated traffic surveys, RMS (2013)*
4. *Guide to Traffic Generating Developments, RTA (2002)*
5. *NZ Trips Database Bureau, 2010 – contains survey data and characteristics of each site providing detailed trip information and characteristics for over 700 sites from 1983 to 2011*
6. *First principles assessment preferably based on forecast usage data*
7. *Trip Generation Manual, 9th edition, ITE 2012 – US database and may need to be modified to suit Australian conditions*

TCC Breakwater Report was adopted as the source of trip generation rate information on the basis that:

- It estimates trip generation rates based on surveys of an existing development similar to the proposed development in terms of its land use, scale, location and so on, i.e. GTIA source 1; and
- The trip generation rates were developed in consultation with Council.

In addition to traffic surveys on Sir Leslie Thiess Drive and Mariners Drive, the TCC Breakwater Report used the following additional data sources in deriving traffic generation rates:

- "Guide to Traffic Generating Development" by the Road and Traffic Authority of New South Wales, i.e. GTIA source 4;
- "Traffic Overview Report: Townsville Cruise and Military Vessel Facility" by CGH for the Snowy Mountains Engineering Corporation; and
- Traffic counts for residential catchments by the City of Thuringowa, i.e. GTIA source 1.

The ferry terminal trip generation rate provided by the TCC Breakwater Report was also verified in the Traffic and Transport Impact Assessment by a first principle assessment based on forecast usage provided by SeaLink, i.e. GTIA source 6.

A review of GTIA's preferred hierarchy of data sources indicates that:

- Source 4 is older than the TCC Breakwater Report;
- Sources 2 and 5 explicitly include data which is older than the TCC Breakwater Report;
- Source 3 is based primarily on traffic generation surveys conducted between 2009 and 2012 but still relies on surveys conducted in 1978 and 1990 for some land uses; and
- The Introduction to source 7 states that "average trip generation rates in this manual represent weighted averages from studies conducted throughout the United States and Canada since the 1960s".

This indicates that all reference documents listed as preferred data sources in the GTIA to some extent rely on traffic generation surveys which are older than the TCC Breakwater Report.

Review of TCC Data

TRAFFIC COUNTS

The traffic count for Sir Leslie Thiess Drive taken in April 2016 showed four (4) peak hours for bidirectional traffic on weekdays as listed in Table 1

Table 1: Sir Leslie Thiess Drive Peak Hours (April 2016)

Hour	Northbound	Southbound	Bidirectional
8:00AM – 9:00AM	94vph	97vph	192vph
11:00AM – 12:00PM	112vph	95vph	207vph
5:00PM – 6:00PM	128vph	119vph	246vph
8:00PM – 9:00PM	121vph	126vph	247vph

Existing (2019) peak hour traffic volumes estimated in the Premise Traffic and Transport Impact Assessment for Sir Leslie Thiess Drive north of the new ferry terminal were:

- Morning peak hour – 135 northbound : 115 southbound; and
- Evening peak hour – 115 northbound : 135 southbound.

These, estimated 2019 morning peak hour traffic volumes exceed the morning peak hour traffic volumes observed in the 2016 TCC data by between 18% and 43%.

The estimated 2019 evening peak hour traffic volumes are up to 11% below that observed in the 2016 TCC data for the northbound direction, however, the maximum GEH statistic in either direction during either evening peak hour is 1.4. The RMS Traffic Modelling Guidelines recommend that the GEH statistic be:

- Less than 10.0 for all road links;
- Less than 5.0 for 85% of road links; and
- Less than 4.0 for directional screenlines.

These targets are all achieved.

Therefore, it is concluded that existing (2019) peak hour traffic volumes estimated in the Premise Traffic and Transport Impact Assessment provide an acceptable if not conservative match with observed 2016 peak hour volumes from the TCC supplied data.

TAIM FORECASTS

Table 2 summarises the average daily traffic on Sir Leslie Thiess Drive north of the ferry terminal as observed in 2016 and forecast by the TAIM.

Table 2: Daily Traffic Observed in 2016 and Forecast by TAIM

Year	AADT	
	Northbound	Southbound
2016 (Count)	1,981	1,982
2021 (TAIM)	2,565	5,057
2026 (TAIM)	3,212	5,780
2031 (TAIM)	3,994	6,187
2036 (TAIM)	4,491	6,529

Review of Table 2 data indicates that daily traffic observed on Sir Leslie Thiess Drive has a balanced directional split, i.e. 1981 northbound : 1982 southbound. However, TAIM estimates southbound traffic volumes which are more than 2,000vph greater than the northbound volumes. Therefore, southbound volumes forecast by TAIM are at least 45% greater than forecast northbound volumes. This suggests a fundamental error in either forecast traffic generation or the zone connectors used for modelling traffic in the Sir Leslie Thiess Drive catchment. Where the small, closed catchment of Sir Leslie Thiess Drive allowed Premise to model existing traffic with an acceptable level of accuracy, it has made the large scale TAIM very sensitive to minor coding errors when forecasting traffic in the study area. Therefore, in the context of the Townsville Marine Tourism Precinct, the TAIM is only considered useful for estimating traffic growth.

Northbound AADT data from Table 2 was plotted in Excel and a trendline fitted. A linear trend line resulted in a higher R^2 statistic ($R^2 = 0.9962$) than an exponential trend line ($R^2 = 0.9849$). The linear trend line indicated an average growth of 129vpd per annum for the period from 2016 to 2036. This corresponds to 6.5% per annum growth relative to 2016 AADT.

Allowing for 6.5% linear growth in observed 2016 traffic, traffic volumes estimated in the Premise Traffic and Transport Impact Assessment provide an acceptable match to forecast traffic until at least 2020.

Premise was unable to predict with certainty the form or timing of future development in the Sir Leslie Thiess Drive catchment. Therefore, Section 5.4.2 of the Premise Traffic and Transport Impact Assessment contains a flow scale analysis for the study area road network to determine the factor by which estimated traffic could be increased before any of the intersections within the study area reached either their practical capacity or delays became a safety concern. The flow scale determined was 241% which corresponds to 21 years of growth at the linear rate of 6.5% per annum.

The flow scale analysis provides confidence that the study area road network can accommodate the proposed development and background traffic growth until at least 10 years after the development is completed as required by Townsville City Plan SC6.4.3.14 Traffic Impact Assessment.

Response Conclusion

Considering the above clarification, literature review and review of TCC data we:

- Confirm that the method of projection used for traffic forecasting in the Premise Traffic and Transport Impact Assessment Report Number HON0031/R01 Rev.B dated 17 April 2019 is:
 - Fit for purpose; and
 - Consistent with the method of projection used in traffic models developed by Townsville City Council;
- Strongly refute the implication of the Information Request that more recent trip generation rate information is available for the proposed development;
- Affirm that we still consider the trip generation rate information contained in the TCC Breakwater Report to be the best available data because it was:
 - Developed in consultation with Townsville City Council; and
 - Validated by surveys of an existing development similar to the proposed development in terms of its land use, scale, location and so on; and
- Confirm that the traffic modelling and analysis techniques adopted in the Premise Traffic and Transport Impact Assessment Report Number HON0031/R01 Rev.B dated 17 April 2019 are sufficiently conservative to allow for the TCC traffic counts taken in 2016 and traffic forecasts by the TAIM.

Additional Concerns

We note MEDQ's statement that "additional concerns regarding traffic / transport and design matters that will be sought to be resolved through forthcoming further issues request/s".

The Traffic and Transport Impact Assessment will not be revised until these further issues have been specified.

If you have any queries in relation to the above, please contact Mr Bradley Jones on (07) 4772 0666.

Yours sincerely



Bradley Jones RPEQ
Senior Traffic Engineer
Premise Australia Pty Ltd

Cc: Mr George Milford, Milford Planning Consultants (via email)

ANNEXURE G
PUBLIC PASSENGER TRANSPORT ASSESSMENT (17 JULY 2019)



Premise

HONEYCOMBES PROPERTY GROUP

TOWNSVILLE MARINE TOURISM PRECINCT
FERRY TERMINAL
CNR THE STRAND AND SIR LESLIE THIESS DRIVE

PUBLIC PASSENGER TRANSPORT ASSESSMENT

Report No: HON0031/R02

Rev: A

Date: 17 July 2019



ENGINEERING



ENVIRONMENT



AGRICULTURE



WATER

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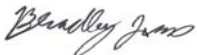
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DOCUMENT AUTHORISATION					
Revision		Rev. Date		Report Details	
DRAFT		11 July 2019		For Comment	
1		16 July 2019		Revised local bus stop turnaround	
A		17 July 2019		For Submission	
Prepared By		Reviewed By		Authorised By	
Bradley Jones RPEQ		Daniel Marais		Bradley Jones	

1 INTRODUCTION

Premise Australia Pty Ltd (Premise) was engaged by Honeycombes Property Group (Honeycombes) to undertake a Public Passenger Transport Assessment for the proposed development located at the Townsville Marine Tourism Precinct, Sir Leslie Thiess Drive, Townsville City, in response to the "Further Issues" letter dated 24 June 2019 from the Minister of Economic Development Queensland (EDQ) to Honeycombes.

This report supplements previous advice provided by Premise in:

- *Traffic and Transport Impact Assessment: Townsville Marine Tourism Precinct – Ferry Terminal* (HON0031/R01revB) dated 17 April 2019;
- *Townsville Marine Tourism Precinct – Ferry Terminal / Desk-Top External Road Network Impact Assessment* letter (HON0031-L02-JTP) dated 17 April 2019; and
- *Townsville Marine Tourism Precinct – Ferry Terminal / Response to DEV2019/1027 "MEDQ Information Request and Notification Not Required Copy"* letter (HON0031-L03-JTP) dated 25 June 2019.

1.1 Background

Premise produced *Traffic and Transport Impact Assessment: Townsville Marine Tourism Precinct – Ferry Terminal* (HON0031/R01revB) and *Townsville Marine Tourism Precinct – Ferry Terminal / Desk-Top External Road Network Impact Assessment* letter (HON0031-L02-JTP) both dated 17 April 2019 which were submitted with a development application for land on the northeast corner of the Strand / Sir Leslie Thiess Drive intersection. The development application consisted of:

- 1,345m² ferry terminal and bus hub including waiting areas, ferry operator offices and workshop;
- 99-room hotel with 306m² restaurant / bar
- 474m² commercial tenancy;
- 506m² research & education facility;
- 682m² of retail across two (2) tenancies; and
- 461 space multi-level car park plus coach / taxi zone.

The method of projection used for traffic forecasting in HON0031/R01revB was based on land use and trip generation rates sourced from *Breakwater and Associated Developments: Assessment of Peak Hour Traffic Volumes* (TCC Breakwater Report) dated 11 December 2007 by C&G Horman Pty Ltd for Townsville City Council (TCC).

EDQ responded to the development application with:

- "Information Request and Notification Not Required" letter dated 18 June 2019; and
- "Further Issues" letter dated 24 June 2019.

Both of the above letters are attached in Appendix A.

The "Information Request and Notification Not Required" letter required provision of a revised Traffic and Transport Impact Assessment that:

- i. Is based on:
 - a. Recent trip generation rate information; or
 - b. New traffic counts;
- ii. Contains forecasting that gives consideration to Council's Townsville Aimsun Integrated Model (TAIM), which forecasts anticipated development growth within the PDA [Priority Development Area].

On 24 June 2019, TCC provided:

- Traffic counts for Sir Leslie Thiess Drive and SeaLink (formerly Sunferries) carpark taken in April 2016; and
- TAIM forecasts.

Townsville Marine Tourism Precinct – Ferry Terminal / Response to DEV2019/1027 "MEDQ Information Request and Notification Not Required Copy" letter (HON0031-L03-JTP) dated 25 June 2019 responded to the "Information Request and Notification Not Required" letter and concluded that:

- The method of projection used for traffic forecasting in HON0031/R01revB is:
 - Fit for purpose; and
 - Consistent with the method of projection used in traffic models development by TCC including Council's TAIM;
- Based on a review of the preferred hierarchy of data sources for traffic generation rates listed in the *Guide to Traffic Impact Assessment* (Transport and Main Roads, December 2018), that the TCC Breakwater Report is the most recent source available for trip generation rate information for the proposed development;
- Reiterated that the trip generation rate information contained in the TCC Breakwater Report is the best available data because it was:
 - Developed in consultation with TCC; and
 - Validated by surveys of an existing development similar to the proposed development in terms of its land use, scale, location and so on; and
- Confirmed that the traffic modelling and analysis techniques adopted in HON0031/R01revB are sufficiently conservative to allow for the TCC traffic counts taken in 2016 and traffic forecasts by the TAIM.

The "Further Issues" letter identified several further issues as indicated in Appendix A. This report responds specifically to items:

1. Public Transport Infrastructure Manual (PTIM) 2015; and
5. Pedestrian crossing / refuge locations.

1.2 Scope and Study Area

Consistent with HON0031/R01revB, the impact assessment area consists of the development site as shown by Figure 1-1 and the geometric frontage of the site including Sir Leslie Thies Drive and The Strand.



Figure 1-1: Impact Assessment Scope (adapted from Queensland Globe)

The construction period is expected to commence 2019 with opening of the development expected in late 2020.

The impact mitigation period for access intersections is 10 years after the opening of the final stage resulting in a design year of 2030.

The scope of this report includes assessment against the relevant criteria of the PTIM as requested in the "Further Issues" letter.

2 EXISTING CONDITIONS

Existing conditions are documented in HON0031/R01revB including:

- Land use and zoning;
- Adjacent land uses;
- Surrounding road network;
- Intersection performance;
- Site access;
- Public transport; and
- Active transport.

The following sections supplement the existing condition information contained in HON0031/R01revB.

2.1 Adjacent Land Uses / Approval

Figure 2-1 reproduced from HON0031/R01revB shows land use within the Strand / Sir Leslie Thies Drive catchment. This is a closed catchment where the only point of entry / exit is the Strand / King Street intersection.



Figure 2-1: Subject site and surrounding area land use (adapted from Queensland Globe)

Not referenced in HON0031/R01revB is the Hive located on the southern side of the Strand between Wickham Street and King Street (refer Figure 1-1) which received Preliminary Approval of the Hive Structure / Precinct Plan on 6 December 2018. The Hive is located outside the closed Strand / Sir Leslie Thies Drive catchment and therefore will not directly impact on study area.

2.2 Traffic Volumes

Traffic counts for Sir Leslie Thiess Drive and SeaLink (formerly Sunferries) carpark taken in April 2016 provided by TCC (refer Section 1.1) are attached in Appendix B.

2.2.1 Sir Leslie Thiess Drive Traffic Volumes

Figure 2-2 shows the daily traffic volume in each direction on Sir Leslie Thiess Drive as recorded from Thursday 14 to Wednesday 20 April 2016. The peak day was Saturday with a total two-way traffic volume of 4,879 vehicles per day (vpd). The greatest difference in northbound and southbound traffic occurred on Friday (51% northbound : 49% southbound) and Sunday (48% northbound : 52% southbound). This is consistent with the dominant land use in the Sir Leslie Thiess Drive catchment north of the ferry terminal being casual accommodation with people arriving on Friday, increasing the catchment's traffic generation on Saturday and departing Sunday. Averaged over seven days, the northbound volume was 1,981vpd and 1,982vpd southbound which is consistent with traffic flows in each direction on Sir Leslie Thiess Drive being balanced over the course of the week, that is, whatever enters the Sir Leslie Thiess Drive catchment exits the Sir Leslie Thiess Drive catchment.

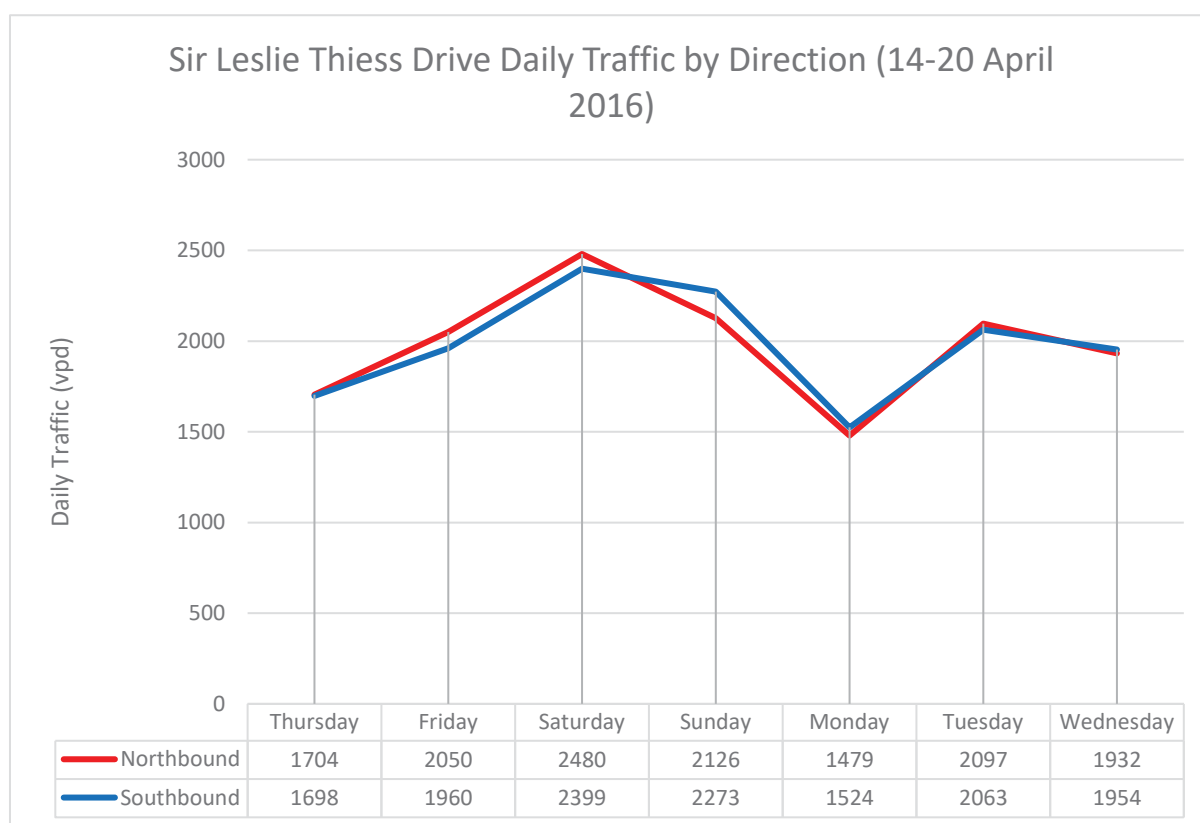


Figure 2-2: Sir Leslie Thiess Drive daily traffic by direction (14-20 April 2016)

The weekday average traffic count data indicates five (5) peak hours on Sir Leslie Thiess Drive as listed in Table 2-1. Of these peak hours the ones considered relevant to this assessment are the commuter peak hours occurring from 8AM to 9AM and 5PM to 6PM.

Table 2-1: Sir Leslie Thiess Drive Average Weekday Traffic Volumes (April 2016)

Hour	Northbound	Southbound	Bidirectional
8AM-9AM	94vph	97vph	192vph
11AM-12noon	112vph	95vph	207vph
2PM-3PM	88vph	116vph	204vph
5PM-6PM	128vph	119vph	246vph
8PM-9PM	121vph	126vph	247vph

Note: vph = vehicles per hour.

2.2.2 SeaLink Car Park Traffic Volumes

Two (2) traffic counts were taken at the SeaLink (formerly Sunferries) car park in April 2016 as attached in Appendix B. The counts are described as:

- Sunferries / Long Distance Bus NB carpark; and
- Sunferries / Long Distance Bus SB carpark.

As shown by Figure 1-1, the existing ferry terminal has separate entry lanes for northbound and southbound traffic on Sir Leslie Thiess Drive and a single exit lane to Sir Leslie Thiess Drive southbound. It is assumed that only the car park entry was counted, and that NB carpark and SB carpark refer respectively to the entry for northbound traffic on Sir Leslie Thiess Drive and the entry for southbound traffic.

Figure 2-3 shows the daily traffic volume in each direction at the SeaLink car park as recorded from Sunday 17 to Saturday 23 April 2016. The peak day was Friday, however, as this was the Friday of the ANZAC Day long weekend recorded traffic may be atypical. Most of the traffic is eastbound which is consistent with the counted lanes being the entry to the existing ferry terminal. However, westbound traffic with one (1) westbound vehicle at the SB count location for every six (6) eastbound vehicles and at the NB count location for every four (4) eastbound vehicles. This relatively high proportion of wrong way traffic on one-way lanes could reflect illegal vehicle movements or an error in the traffic count data. In the absence of a traffic count on the exit lane of the existing ferry terminal the traffic count taken at the SeaLink (formerly Sunferries) car park in April 2016 is not considered reliable enough to be used to derive a traffic profile for the ferry terminal.

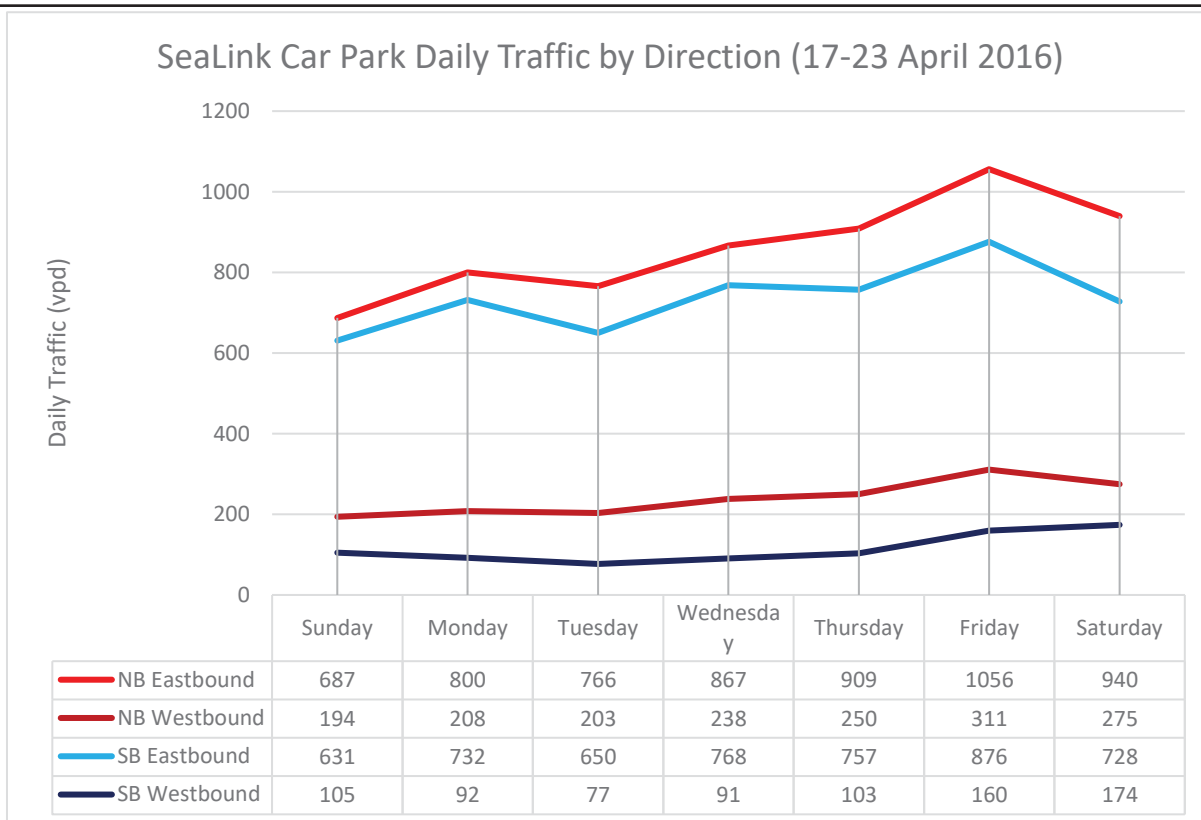


Figure 2-3: SeaLink car park daily traffic by direction (17-23 April 2016)

3 PROPOSED DEVELOPMENT DETAILS

3.1 Development Site Plan

The development site plan has been amended in response to the “Further Issues” letter. The amended development site plan is attached in Appendix C. The only significant change to the development composition is replacement of the research & education facility by commercial tenancy. Therefore, this traffic impact assessment is based on the following development composition:

- Ferry terminal and bus hub including waiting areas, ferry operator offices and workshop;
- 99-room hotel with 306m² restaurant / bar;
- 980m² commercial tenancy;
- 682m² of retail across two (2) tenancies; and
- Multi-level car park plus coach / taxi zones.

3.2 Operational Details

The proposed development is expected to commence operation in late 2020.

The proposed SeaLink ferry terminal is expected to operate in a similar fashion to the existing ferry terminal with services operating from 5:30AM to 10:30PM with additional 11:30PM services provided on Friday and Saturday. Peak periods are expected to coincide with morning and evening commuter peak hours.

3.3 Proposed Access and Parking

The most significant change to the proposed access arrangement is provision of a service lane internal to the site on the Sir Leslie Thiess Drive frontage. The service lane is proposed to operate one-way from the new access road at the northern end of the site to a left-out only exit onto Sir Leslie Thiess Drive near the Strand. Left-in-left-out access to the multi-level car park will be provided via the service lane and the service lane will also serve as the local / school bus stop and kiss-and-drop facility. HON0031/R01revB assumed these activities would occur external to the site with local / school buses stopping on Sir Leslie Thiess Drive and kiss-and-drop activities occurring at the eastern end of the Strand.

Other significant changes to access / parking are:

- Designation of a taxi rank at the eastern end of the Strand separate to the kiss-and-drop facility;
- Separation of access to the car park from access to service areas and van parking with both areas accessed via the service lane; and
- Provision of a buffer strip on the service lane between the traffic lane and the parking lane on the right-hand side.

4 DEVELOPMENT TRAFFIC

4.1 Traffic Generation

4.1.1 Bus Trips

Bus trips in HON0031/R01revB were estimated from first principles. No change has been made to bus trips documented in HON0031/R01revB. Table 4-1 extracted from HON0031/R01revB shows estimated bus trips.

Table 4-1: Bus Trips (extracted from HON0031/R01revB)

Bus Type	Morning Peak Hour			Evening Peak Hour		
	Inbound	Outbound	Total	Inbound	Outbound	Total
Tourist buses / coaches	1vph	1vph	2vph	1vph	1vph	2vph
Local buses	6vph	6vph	12vph	6vph	6vph	12vph
School buses	7vph	7vph	14vph	0vph	0vph	0vph
Total buses	14vph	14vph	28vph	7vph	7vph	14vph

4.1.2 Car Trips

Light vehicle trips in HON0031/R01revB was estimated from:

- A first principles assessment based on forecast ferry terminal usage provided by Sealink; and
- Traffic generation rates specified in the TCC Breakwater Report.

HON0031/R01revB estimated the traffic profile of the research & education facility using the same assumptions as for the commercial tenancy. Therefore, the replacement of the research & education facility by commercial tenancy does not require revision of the traffic model.

In addition to the TCC Breakwater Report, consideration was given to traffic generation rates contained in Trip Generation Manual, 9th edition, ITE 2012, however, these rates were not used as they:

- Could not be applied to the available development information; or
- Were not considered sufficiently conservative when compared to Australian data for similar land uses.

Trip generation rates in the TCC Breakwater Report were developed in consultation with TCC using the following data sources:

- Guide to Traffic Generating Development, RTA (2002);
- Traffic Overview Report: Townsville Cruise and Military Vessel Facility by C&G Horman Pty Ltd for the Snowy Mountains Engineering Corporation; and
- Traffic counts for residential catchments by the City of Thuringowa.

Morning peak hour trip generation rates in the TCC Breakwater Report were validated against traffic count data collected on Mariners Drive in February 2007 and Sir Leslie Thies Drive November 2005.

With reference to the *Guide to Traffic Impact Assessment* (Transport and Main Roads, December 2018), it is concluded that trip generation rate information used in HON0031/R01revB is the best available data for assessing the proposed development.

Light vehicle trips in HON0031/R01revB were assumed to include trips by private car, taxi and ride share, e.g. Uber. This assumption had been altered in this Public Passenger Transport Assessment to estimate car trips. This Public Passenger Transport Assessment conservatively assumes that the light vehicle trips in HON0031/R01revB includes only trips by private car and ride share with taxi trips resulting in additional light vehicle trips.

Table 4-2 adapted from HON0031/R01revB shows the conservatively assumed car trips.

Table 4-2: Car Trips (adapted from HON0031/R01revB)

Development Component	Morning Peak Hour			Evening Peak Hour		
	Inbound	Outbound	Total	Inbound	Outbound	Total
Hotel and restaurant / bar porte-cochere	12vph	12vph	24vph	35vph	15*vph	50*vph
Hotel and restaurant / bar car park	0vph	16vph	16vph	0*vph	0vph	0*vph
Ferry terminal kiss-and-drop	128vph	128vph	256vph	128vph	128vph	256vph
Ferry terminal car park	128vph	0vph	128vph	0vph	128vph	128vph
Commercial / Retail car park	12vph	0vph	12vph	24vph	35vph	59vph
Total cars	280vph	156vph	436vph	187vph	306vph	493vph

* Does not include 20vph circulating from the porte-cochere to the car park.

4.1.3 People Trips

The "Further Issues" letter requests forecasting of pedestrian, cyclist and taxi passenger numbers. To do this the following methodology was adopted:

- Estimate people trips by private vehicle based on estimated car trips (refer Section 4.1.2);
- Use "Method of Travel to Work" data from the 2016 Census available through the Australian Bureau of Statistics website (www.abs.gov.au) to obtain the ratio of trips by private vehicle to trips by other modes;
- Using the mode split ratios and the estimated trips by private vehicles estimate the number of people trips by ferry, bus, taxi, bicycle and foot.

To convert car trips to people trips, it is assumed that:

- For the hotel and restaurant / bar:
 - All people are outbound in the morning peak hour and inbound during the evening peak hour;
 - Each outbound vehicle at the porte-cochere in the morning is assumed to pick-up one (1) person and each inbound vehicle at the porte-cochere in the evening is assumed to pick-up one (1) person;
 - During the evening peak hour, it is assumed that each vehicle circulating from the porte-cochere to the car park results in one (1) hotel patron entering the precinct via the car park, i.e. the car driver drops one (1) person off at the porte-cochere and then parks their car;
 - For consistency with the evening peak hour assumptions, it is assumed that during the morning peak the average vehicle occupancy for vehicles leaving the car park is two (2);
- For the ferry terminal:
 - Consistent with assumptions for the hotel and restaurant / bar, the average occupancy of vehicles using the car park is two (2);
 - The kiss-and-drop facility is used equally for drop-off and pick-up during both the morning and evening peak hours, i.e. 64 drop-offs and 64 pick-ups during both peaks;
 - Consistent with assumptions for the hotel and restaurant / bar, it is assumed that one (1) person is dropped-off / picked-up by each vehicle;
- For the commercial and retail tenancies, every inbound vehicle represents one (1) person travelling to the tenancy by private vehicle and every outbound vehicle represents one (1) person travelling from the tenancy by private vehicle.

Table 4-3 shows the number people trips by private vehicles estimated from Table 4-2 and the above assumptions.

Table 4-3: Estimated People Trips by Private Vehicle

Development Component	Morning Peak Hour			Evening Peak Hour		
	Inbound	Outbound	Total	Inbound	Outbound	Total
Hotel and restaurant / bar porte-cochere	0pph	12pph	12pph	35pph	0pph	35pph
Hotel and restaurant / bar car park	0pph	32pph	32pph	20pph	0vph	20pph
Ferry terminal kiss-and-drop	64pph	64pph	128pph	64pph	64pph	128pph
Ferry terminal car park	256pph	0pph	256pph	0vph	256pph	256pph
Commercial / Retail car park	12pph	0pph	12pph	24pph	35pph	59pph
Total people	332pph	108pph	440pph	143pph	355pph	498pph

Note: pph = people per hour.

Table 4-4 shows 2016 Census “Method of Travel to Work” data for the Townsville Urban Centre (excludes Magnetic Island) and Magnetic Island.

Table 4-4: Method of Travel to Work (from 2016 Census)

Method of Travel	Townsville Urban Centre	Magnetic Island
Train	18	0
Bus	945	19
Ferry	26	39
Tram (includes light rail)	8	0
Taxi	138	0
Car, as driver	55,889	325
Car, as passenger	4,744	42
Truck	486	6
Motorbike / scooter	987	15
Bicycle	1,265	22
Other	670	8
Walked only	2,144	93
<i>Total one method</i>	<i>67,323</i>	<i>566</i>
Method of travel to work not stated	562	15

In determining the ratio of people trips by private vehicle to people trips by other modes, it is assumed that trips by private vehicle include travel by car as drive, car as passenger, truck and motorbike / scooter. To provide a conservative assessment of trips by other modes each mode was increased by the number of people whom did not state a method of travel to work. Table 4-5 shows the assumed ratios for each method of travel relative to people trips by private vehicle.

Table 4-5: Method of Travel Ratio Relative to Trips by Private Vehicle

Method of Travel	Townsville Urban Centre	Magnetic Island
Bus	2.4%	8.8%
Taxi	1.1%	3.9%
Private vehicle	100.0%	100.0%
Bicycle	2.9%	9.5%
Walked	4.4%	27.8%

The method of travel ratios in for the Townsville Urban Centre are considered to apply to most trips to and from the proposed development. The exception to this is expected to be counter peak trips generated by the ferry terminal for which Magnetic Island method of travel data is likely to be more accurate. Magnetic Island travel associated with the proposed development will use ferry and potentially other modes. The available data on Magnetic Island methods of travel to work including ferry are:

- Ferry – 39 people;
- Bus and ferry – 4 people; and
- Ferry, car as driver – 74 people.

Assuming “ferry only” represents “ferry and walked” and “ferry, car as driver” represents trips by private vehicle, the ratios of travel by modes including ferry relative to ferry and private vehicle are:

- Walked – 53%;
- Bus – 5%; and
- Private vehicle – 100%.

Therefore, to provide a conservative assessment of trips generated by the ferry terminal in the counter peak direction it is assumed that for every 100 trips by private vehicle (through the kiss-and-drop facility) there will be:

- 9 trips by bus;
- 4 trips by taxi;
- 10 trips by bicycle; and
- 53 trips by foot.

Based on the estimated people trips by private vehicle in Table 4-3 and the above assumptions regarding the ratios of people trips by foot (walking) to people trips by private car, the conservatively estimated number of external people trips generated by the development is shown by:

- Table 4-6 for trips by bus;
- Table 4-7 for trips by taxi;
- Table 4-8 for trips by bicycle; and
- Table 4-9 for trips by foot (pedestrians).

Table 4-6: Estimated People Trips by Bus (Commuters)

Development Component	Morning Peak Hour			Evening Peak Hour		
	Inbound	Outbound	Total	Inbound	Outbound	Total
Hotel and restaurant / bar	0pph	1pph	1pph	1pph	0pph	1pph
Ferry terminal	8pph	6pph	14pph	6pph	8pph	14pph
Commercial / Retail	0pph	0pph	0pph	1pph	1pph	2pph
Total people	8pph	7pph	15pph	8pph	9pph	17pph

Table 4-7: Estimated People Trips by Taxi

Development Component	Morning Peak Hour			Evening Peak Hour		
	Inbound	Outbound	Total	Inbound	Outbound	Total
Hotel and restaurant / bar	0pph	0pph	0pph	0pph	0pph	0pph
Ferry terminal	4pph	3pph	7pph	3pph	4pph	7pph
Commercial / Retail	0pph	0pph	0pph	0pph	0pph	0pph
Total people	4pph	3pph	7pph	3pph	4pph	7pph

Table 4-8: Bicycle Trips

Development Component	Morning Peak Hour			Evening Peak Hour		
	Inbound	Outbound	Total	Inbound	Outbound	Total
Hotel and restaurant / bar	0vph	1vph	1vph	2vph	0vph	2vph
Ferry terminal	9vph	6vph	15vph	6vph	9vph	15vph
Commercial / Retail	0vph	0vph	0vph	1vph	1vph	2vph
Total cars	9vph	7vph	16vph	9vph	10vph	19vph

Table 4-9: Pedestrian Trips

Development Component	Morning Peak Hour			Evening Peak Hour		
	Inbound	Outbound	Total	Inbound	Outbound	Total
Hotel and restaurant / bar	0pph	2pph	2pph	2pph	0pph	2pph
Ferry terminal	14pph	34pph	48pph	34pph	14pph	48pph
Commercial / Retail	1pph	0pph	1pph	1pph	2pph	3pph
Total pedestrians	15pph	36pph	51pph	37pph	16pph	53pph

4.1.3.1 People Trips by Bus

There is an inconsistency between the number of bus trips shown by Table 4-1 and the number of people trips by bus shown by Table 4-6 in that the peak period for bus movements is the morning peak hour and the peak period for people trips by bus is the evening peak hour.

With reference to the bus types and land uses generating trips by bus it is assumed that:

- The one (1) person travelling by bus associated with the hotel and restaurant travels by long distance coach or tourist bus;
- The other bus passengers listed in Table 4-6 all travel by local bus implying that on average each local bus picks-up and drops-off between one (1) and 1.5 passengers; and
- The people trips by bus listed in Table 4-6 do not include students' trips by school bus.

Therefore, it is assumed that on average each school bus picks up two (2) students from the ferry terminal during the morning peak hour. Including students travelling by school buses, Table 4-10 shows the revised estimate of people trips by bus.

Table 4-10: Estimated People Trips by Bus (including Students)

Development Component	Morning Peak Hour			Evening Peak Hour		
	Inbound	Outbound	Total	Inbound	Outbound	Total
Hotel and restaurant / bar	0pph	1pph	1pph	1pph	0pph	1pph
Tourist bus / coach						
Ferry terminal	8pph	6pph	14pph	6pph	8pph	14pph
Local bus						
Ferry terminal	0pph	14pph	14pph	0pph	0pph	0pph
School bus						
Commercial / Retail	0pph	0pph	0pph	1pph	1pph	2pph
Local bus						
Total people	8pph	21pph	29pph	8pph	9pph	17pph

4.1.4 Taxi Trips

As indicated by Table 4-7 it is estimated that during the morning peak hour four (4) people will travel to and three (3) people will travel from the development by taxi with the pattern reversed in the evening peak hour. Conservatively assuming one (1) person per taxi and no reverse loading of taxis, the development will generate seven (7) inbound and seven (7) outbound taxis during both peak periods.

4.1.5 Van Trips

Sealink has requested provision of six (6) parking spaces for vans / mobile homes out of a total of 320 spaces. On the basis that 320 spaces result in a peak hour traffic generation of 128 car trips it is estimated that the six (6) van spaces will generate 2 van trips during peak hours with these trips being inbound during the morning peak hour and outbound during the evening peak hour.

4.2 Trip Distribution

4.2.1 External Trip Distributions

As stated in HON0031/R01revB, all motor vehicle (bus, car and taxi) trips to / from the development, Sir Leslie Thiess Drive and the eastern end of the Strand must use the Strand link between Sir Leslie Thiess Drive and King Street.

Pedestrian and bicycle trips to / from the development could use the following three (3) access routes:

- Shared path on the Strand frontage;
- Verge footpaths through the King Street Quarter; or
- Waterfront promenade along Ross Creek.

People who walk or ride a bicycle to the development in the morning or from the development in the evening are expected to be residents of Townsville City and North Ward. It is expected that these people will use the high amenity shared path on the Strand frontage when travelling to / from the development and cross Sir Leslie Thiess Drive at the northern end of the development site where direct connectivity to the Strand shared path is provided.

The most direct route between the development site and the Townsville principle centre (CBD) would use the verge footpaths through the King Street Quarter. It is assumed that pedestrians / cyclists using this route will cross Sir Leslie Thiess Drive near the Strand and cross the Strand using the existing pedestrian refuge facility on the western side of King Street. It is assumed that this is used by pedestrians / cyclists who are outbound from the ferry terminal in the morning peak hour and inbound to the ferry terminal in the evening peak hour.

The waterfront promenade will connect the proposed development to tourist activities in the King Street Quarter. It is expected that this facility will be popular with tourists but will not appeal to commuters because of its lack of directness. Therefore, it is assumed that people associated with the hotel and restaurant / bar who walk or ride a bike will use the waterfront promenade. The waterfront promenade directs pedestrians by bicycle riders to cross the Strand via the plaza area adjacent to Ross Creek and clear of vehicle movements.

4.2.2 Internal Trip Distribution

Given the mixed-use nature of the development and function as a public transport hub consideration needs to be given to the distribution of people movements internal to the development.

Table 4-11 and Table 4-12 show the estimate internal people trip distribution matrices for the morning and evening peak hours respectively. These matrices are based on the information contained in Sections 4.1 and 4.2.1 as well as:

- Assuming an average van occupancy of two (2) people consistent with the assumed car occupancy for cars parking to use the ferry; and
- Including internal trips between the hotel and the restaurant / bar, and commercial and retail tenancies which were assumed in HON0031/R01revB to reduce the vehicle trip generation of these uses by 30%.

Table 4-11: Morning Peak Hour Internal People Trip Distribution

	Waterfront	Kings Street quarter	Strand shared path	Commercial / retail	Restaurant / bar	Hotel	Van park	Car park	Porte-cochere	Kiss-and-drop	Taxi	School bus	Local bus	Tourist bus / coach
Ferry (486pph)	-	40	23	-	-	-	4	256	-	128	7	14	14	-
Tourist bus / coach (1pph)	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Local bus (14pph)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
School bus (14pph)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taxi (7pph)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kiss-and-drop (128pph)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Porte-cochere (12pph)	-	-	-	-	-	12	-	-	-	-	-	-	-	-
Car park (300pph)	-	-	-	12	-	32	-	-	-	-	-	-	-	-
Van park (4pph)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hotel (53pph)	3	-	-	5	-	-	-	-	-	-	-	-	-	-
Restaurant / bar (0pph)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Commercial / retail (18pph)	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Strand shared path (24pph)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kings Street quarter (40pph)	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4-12: Evening Peak Hour Internal People Trip Distribution

	Waterfront	Kings Street quarter	Strand shared path	Commercial / retail	Restaurant / bar	Hotel	Van park	Car park	Porte-cochere	Kiss-and-drop	Taxi	School bus	Local bus	Tourist bus / coach
Ferry (472pph)	-	40	23	-	-	-	4	256	-	128	7	-	14	-
Tourist bus / coach (1pph)	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Local bus (16pph)	-	-	-	2	-	-	-	-	-	-	-	-	-	-
School bus (0pph)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taxi (7pph)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kiss-and-drop (128pph)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Porte-cochere (35pph)	-	-	-	-	7	28	-	-	-	-	-	-	-	-
Car park (335pph)	-	-	-	59	4	16	-	-	-	-	-	-	-	-
Van park (4pph)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hotel (79pph)	4	-	-	25	5	-	-	-	-	-	-	-	-	-
Restaurant / bar (16pph)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Commercial / retail (91pph)	-	-	5	-	-	-	-	-	-	-	-	-	-	-
Strand shared path (28pph)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kings Street quarter (40pph)	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4-11 and Table 4-12 should not be considered as a comprehensive listing of all internal people movements associated with the proposed development but does assist in identifying major activity nodes within the development and comparing the relative importance of various desire lines.

The most significant activity centres within the development are:

- The ferry terminal (approximately 486pph in the morning peak);
- The car park (335pph in the evening peak);
- The kiss-and-drop facility (128pph);
- The combination of the commercial and retail tenancies (91pph in the evening peak);
- The Hotel (79pph in the evening peak);
- King Street Quarter (40pph); and
- Porte-cochere (35pph in the evening peak).

The most significant desire lines are:

- Ferry terminal – car park (256pph);
- Ferry terminal – kiss-and-drop (128pph);
- Car park – combined commercial and retail tenancies (59pph in the evening peak);
- Ferry terminal – King Street quarter (40pph);
- Car park – hotel (32pph in the morning peak);
- Hotel – porte-cochere (28pph in the evening peak); and
- Ferry terminal – bus hub (28pph in the morning peak).

4.3 Development Traffic Volumes on the Network

Development traffic volumes on the road network including movements by pedestrians and bicycles are shown by diagrams attached in Appendix D. It is conservatively assumed that all kiss-and-drop activity will take place on the western side of the service lane and result in pedestrian movements across the service lane.

Desire lines are not shown for movements between the ferry terminal, car park, commercial, retail, hotel and porte-cochere as these pedestrian movements do not conflict with motor vehicle movements.

5 IMPACT ASSESSMENT AND MITIGATION

5.1 With and Without Development Traffic Volumes

In HON0031/R01revB, 2019 'without development' traffic was estimated based on land use traffic generation rates. As the land use catchment is closed, through traffic is excluded from the study area and traffic forecasting based on land use is an acceptable alternative to traffic forecasting based on traffic counts. Peak hour traffic estimates in HON0031/R01revB for Sir Leslie Thiess Drive were 135vph northbound and 115vph southbound during the morning peak hour with flows reversed in the evening peak hour.

TMR's *Guide to Traffic Impact Assessment: Frequently Asked Questions (December 2017)* states that, if traffic counts are available within three (3) years of opening, then no background growth factoring is needed. Therefore, 2016 traffic count data contained in Appendix B and summarised in Section 2.2.1 is considered a reasonable estimate of current (2019) peak hour traffic. Compared to the 2016 traffic counts, the estimates of current (2019) traffic contained in HON0031/R01revB are:

- Conservative for the morning peak hour; and
- Consistent with the count data for the evening peak hour.

Notwithstanding the above, on 6 July 2019, TCC supplied peak hour traffic forecasts produced by the TAIM for December 2018 (attached in Appendix E) and instructed that:

- December 2018 TAIM forecasts were to be adopted as current 'without development' traffic; and
- Design life analysis is not required for the development due to road network upgrades which would be provided by the Hive over the next 10 years.

Table 5-1 compares peak hour traffic volumes from the 2016 count data, estimated by Premise in HON0031/R01revB and forecast for December 2018 by TAIM. The TAIM forecasts are approximately double the 2016 counts which implies that development in the Sir Leslie Thiess Drive catchment has doubled in two and a half (2.5) years. TCC are yet to supply the TAIM calibration report or any other documentation to justify this sudden rapid increase in traffic.

Table 5-1: Comparison of Without Development Peak Hour Traffic Sources

Peak Hour	Direction	2016 Count	Premise 2019 Estimate	TAIM 2018 Forecast
Morning 8AM-9AM	Northbound	94vph	135vph (+44%)	197vph (+110%)
	Southbound	97vph	115vph (+19%)	218vph (+125%)
	Total	191vph	250vph (+31%)	415vph (+117%)
Evening ~5PM	Northbound	128vph	115vph (-10%)	203vph (+59%)
	Southbound	119vph	135vph (+13%)	239vph (+101%)
	Total	247vph	250vph (+1%)	442vph (+79%)

On 24 June 2019, TCC supplied screenshots taken from the TAIM for the project timeframes. These screenshots, attached in Appendix F, for the years 2021, 2026, 2031 and 2036 show annual average daily traffic (AADT) assuming no ferry terminal redevelopment and no Hive development.

Figure 5-1 shows average daily traffic on Sir Leslie Thiess Drive north of the ferry terminal as observed in 2016 and forecast by the TAIM. As discussed in Section 2.2.1, average daily traffic on Sir Leslie Thiess Drive observed in April 2016 has a balanced directional split, i.e. 1,981vpd northbound : 1,982vpd southbound. However, TAIM estimates southbound traffic volumes which are more than 2,000vpd greater than northbound volumes. This suggests a fundamental error in either forecast traffic generation or the zone connectors used for modelling traffic in the Sir Leslie Thiess Drive catchment. Where the small, closed catchment of Sir Leslie Thiess Drive allowed Premise to model existing traffic with an acceptable level of accuracy, it has made the large scale TAIM very sensitive to minor coding errors when forecasting traffic in the study area.

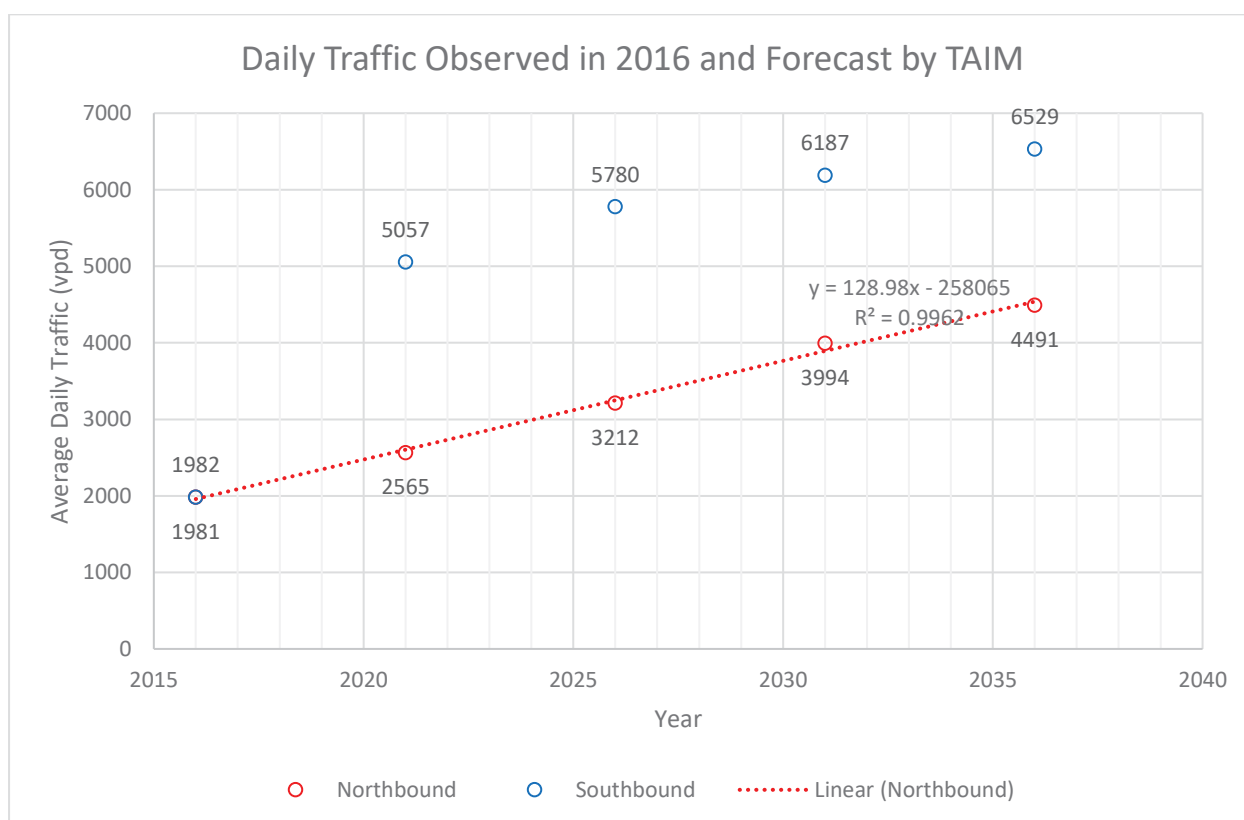


Figure 5-1: Daily traffic observed in 2016 and forecast by TAIM

Despite the above concerns regarding the realism of the TAIM forecasts, this report adopts the TAIM forecasts as current 'without development' traffic as instructed by TCC. The TAIM forecasts are considered highly conservative when compared to current traffic estimates based on either 2016 traffic counts or land use and assumed traffic generation rates.

5.2 Bus Stop Infrastructure

The proposal provides stops for local and school buses on the service lane with coach and tourist bus stops on Sir Leslie Thiess Drive.

As shown in Appendix C, allowance has been made for a 12.8m long and 4.2m deep premium stop at both the local / school bus stop and the coach / tourist bus stop. These dimensions comply with Appendix 5-B Layout and Technical Drawings of the PTIM. All of the supporting components associated with a premium stop listed in Section 5.3.6 of the PTIM will be provided within this footprint, however, the facility may be constructed as a signature bus stop (refer PTIM Section 5.8.1) rather than using a standard premium bus stop design for consistency with the Townsville Marine Tourism Precinct architecture.

The concourse between the coach / tourist bus stop and the kiss-and-drop facility is proposed to be 7.5m wide to provide for the 4.2m deep premium stop and a 3.3m wide zone adjacent to the kiss-and-drop facility. The 3.3m wide zone adjacent to the kiss-and-drop facility can be considered to provide a 1.8m wide path and a 1.5m wide waiting zone in addition to the circulation and waiting space provided at the rear of the premium stop within the premium stop footprint.

The location of the local / school bus stop and coach / tourist bus stop facilitates interchange between ferry and bus in accordance with Section 5.5.1 of the PTIM. Facilities will be provided in accordance with the Disability Standard for Accessible Public Transport 2002.

In accordance with Section 5.5.3 of the PTIM bus stops are located to minimise conflicts between public transport users and vehicle traffic as well as aligning desire lines for public transport users with other pedestrian desire lines to optimise the utilisation of pedestrian infrastructure. Further discussion of pedestrian crossings / refuge locations is provided in Section 5.4 of this report.

The coach / tourist bus stop has been designed as an indented stop in accordance with Section 5.4.3.1 and Table 5.7 of the PTIM. The coach / tourist bus stop is 3.0m wide and 75.5m long providing:

- 15m taper out;
- 17m bay length for the first 14.5m-long coach / tourist bus;
- 5m of space between coaches / tourist buses parked nose-to-tail;
- 14.5m bay length for a second 14.5m-long coach / tourist bus; and
- 21m taper in.

The local / school bus stop has been designed as an on-road stop in accordance with Section 5.4.3.1 and Table 5.7 of the PRIM. The local / school bus stop is considered an on-road stop and not an indented stop because buses arriving and departing the stop are restricted by parked vehicles and not solid kerbing. The local / school bus stop is 52.5m long providing:

- 10m departure length;
- 15m bay length for the first 12.5m-long local / school bus;
- 5m of space between local / school buses parked nose-to-tail;
- 12.5m bay length for a second 12.5m-long local / school bus; and
- 10m arrival length which partially overlaps with access to on-site parking areas.

In accordance with Section 5.8 of the PTIM, layover bays for long distance coaches are provided on the northern side of the access road with pedestrian access to the development provided along the arbor and waterfront promenade around the access road and porte-cochere.

5.3 Taxi Infrastructure

In Section 4.1.3, it was estimated that up to four (4) passengers per hour will require pick-up from the ferry terminal. Therefore, it is recommended that a taxi rank be provided to support the development that can accommodate no less than four (4) taxis.

In accordance with the above recommendation, it is proposed to provide a taxi rank at the eastern end of the Strand as shown in Appendix C. This taxi rank is separated from the kiss-and-drop area used by private and ride share vehicles, and shuttle bus stops.

The taxi rank dimensions comply with the minimum requirements of the PTIM and *AS2890.5-1993 Parking Facilities* being 22.6m to accommodate four (4) taxis.

5.4 Pedestrian Crossing / Refuge Locations

Pedestrian and bicycle desire lines are shown in Appendix D. The arbor on the northern side of the access road, the waterfront promenade along Ross Creek and the plaza area on the Strand allow pedestrians and bicycles to move around motor vehicle movements reducing conflict. Even so, there will be a desire for:

- Pedestrians and bicycles to cross Sir Leslie Thiess Drive at both the northern and southern end of the site to access the Strand and the CBD respectively; and
- Pedestrians to cross the service lane when moving between the kiss-and-drop facility and the ferry terminal.

Some pedestrians and bicycles approaching the development from the Strand frontage (crossing Sir Leslie Thiess Drive at the northern end of the site) will have a valid desire to access the ferry terminal, and commercial and retail tenancies directly from the east without circulating along the waterfront promenade. It is recommended that these pedestrians and bicycles are directed to cross the access road near Sir Leslie Thiess Drive and then pass along the concourse to cross the service lane at the same location as pedestrians moving between the kiss-and-drop facility and the ferry terminal. The alternative route along the eastern side of the service lane is not supported because, even though the volume of conflicting vehicle movements is reduced the total length of the pedestrian link that would conflict with vehicle movements would be increased due to the need to cross the entry and exit lanes of both the car park and the van park / service area.

Based on the above discussion of desire lines, facilities for pedestrians crossing roads are required on:

- Sir Leslie Thiess Drive north of the access road (northern crossing);
- Sir Leslie Thiess Drive at the Strand (southern crossing);
- Service lane; and
- Access road.

The Australasian Pedestrian Crossing Facility Selection Tool (APCFST) available through the Austroads website (<https://austroads.com.au/network-operations/network-management/pedestrian-facility-selection-tool>) was used to determine the most appropriate crossing treatment for each of these locations. For the purpose of the assessments construction and annual maintenance costs were assumed to be zone (0) for all options.

5.4.1 Sir Leslie Thiess Drive Northern Crossing

Currently a median refuge is provided on Sir Leslie Thiess Drive in line with the shared path along the Strand frontage. This facility is located to the south of the existing ferry terminal and is used by pedestrians / bicycles travelling between the ferry terminal and both the Strand and the CBD.

The current crossing location conflicts with the proposed new access road intersection and it will therefore be necessary to relocate the crossing either to the north or the south of the new access road. Relocation of the crossing to the new access road intersection:

- Minimises the volume of conflicting traffic;
- Reduces the number of lanes traffic lanes which need to be crossed;
- Provides connectivity between the recreational shared paths on the Strand frontage and waterfront promenade which does not conflict with any vehicle movements internal to the Townsville Marine Tourism Precinct; and
- Reduces conflict with traffic accessing and egressing existing developments on the western side of Sir Leslie Thiess Drive.

Queensland Globe crash location data shows no pedestrian casualty accidents reported at the existing crossing location over the past 17 years.

With the proposed development, the critical peak for the crossing on Sir Leslie Thiess Drive north of the access road will be the evening peak hour with 17 pedestrians and 11 bicycles expected to use the crossing. During this hour the total of development traffic and TAIM forecasts is 204vph northbound and 240vph southbound.

The APCFST assessment for the Sir Leslie Thiess Drive northern crossing is attached in Appendix G. The existing median refuge was adopted as the base case.

Construction of the access road intersection will require this median to be removed. If no facility were provided to replace the median refuge, there would be a reduction in perceived safety and pedestrian level of service but no significant increase in delay or crash costs.

Location of the crossing adjacent to an intersection makes it unsuitable for zebra or grade separated crossings.

Signalisation of the crossing results in increased delays and is therefore not justified.

The best option from the APCFST assessment is to reinstate the median refuge during construction of the access road intersection and narrow the northbound carriageway of Sir Leslie Thiess Drive from two (2) lanes to one (1) lane. Relative the existing median refuge, APCFST indicates that this option will improve perceived safety and pedestrian level of service and reduce delay costs with no significant increase in crash costs.

5.4.2 Sir Leslie Thiess Drive Southern Crossing

Currently pedestrians and bicycles crossing Sir Leslie Thiess Drive on their way between the ferry terminal and the CBD are accommodated by the median refuge in line with the shared path along the Strand frontage. With relocation of the ferry terminal to the south, the existing crossing facility will not be aligned with the desire line for travel between the ferry terminal and the CBD.

As there is currently no desire line corresponding to the future crossing location crash information was assessed using the APCFST model and not crash history.

With the proposed development, the critical peak for the crossing on Sir Leslie Thiess Drive near the Strand will be the evening peak hour with 34 pedestrians and 6 bicycles expected to use the crossing. During this hour the total of development traffic and TAIM forecasts is 397vph northbound and 574vph southbound.

The APCFST assessment for the Sir Leslie Thiess Drive southern crossing is attached in Appendix H. The base case was assumed to be 'no facility'.

To not provide a facility at this location would be unacceptable as it would be perceived as resulting in long delays and poor safety and provide a poor pedestrian level of service.

Location of the crossing adjacent to an intersection makes it unsuitable for zebra or grade separated crossings.

A median refuge, kerb extensions with median refuge or signals are all expected to yield between \$1.23 million and \$1.39 million of savings. Delay and safety savings are expected to be less and perceived delays greater for the signals than for the other options even though perceived safety and pedestrian level of service will be better. If construction and maintenance costs were included in the assessment it is expected that the benefit cost ratio (BCR) would be much higher for either the median refuge or kerb extensions with median refuge options than for signals.

As construction of the median refuge will be the lowest cost option (other than no facility) it is expected that the BCR will be greatest for this option.

5.4.3 Service Lane Crossing

Pedestrians moving within the proposed development will need to cross the proposed service lane when moving between the kiss-and-drop facility and the ferry terminal.

As this is a totally new facility crash information was assessed using the APCFST model and not crash history.

During the morning peak hour, it is expected that 144 pedestrians, nine (9) bicycles and 157 motor vehicles will pass through the crossing. During the evening peak hour, it is expected that 132 pedestrians, two (2) bicycles and 319 motor vehicles will pass through the crossing.

The APCFST assessment for the service lane crossing is attached in Appendix I. It is assumed that kerb extensions will be provided to minimise the crossing distance and improve visibility between pedestrians and drivers around parked cars. Therefore, the base case has been assumed to be kerb extensions.

The APCFST indicates the highest pedestrian level of service and lowest delay and crash costs are achieved with grade separation. However, a grade separated facility will not coincide with the pedestrian desire line and has therefore been rejected.

The base case with kerb extensions and no other crossing facilities is the option with the lowest delay and crash costs however, perceived safety is poor and pedestrian level of service is moderate.

A zebra with platform and kerb extensions is the best option in terms of perceived delay and safety, pedestrian level of service and anticipated crash costs. However, this option has relatively high delay costs which are only exceeded by signalised crossing options.

The APCFST is probably overestimating delay costs associated with the platform as APCFST does not allow the speed limit or operating speed to be set to less than 30km/h. With a 20km/h speed limit it is expected that the service lane would operate at 25km/h which is the threshold speed identified by Austroads Guidelines for minimising the risk of death or serious injury to pedestrians and cyclists in a collision with a motor vehicle.

Based on the APCFST assessment, it is recommended that the service lane crossing is constructed as a zebra with platform and kerb extensions with the service lane speed limit restricted to 20km/h. As local and school buses will pass through this crossing the platform design will need to align with relevant standards and guidelines for provision of traffic calming on bus routes.

5.4.4 Access Road Crossing

To accommodate pedestrians and bicycles approaching the development from the Sir Leslie Thiess Drive northern crossing who wish to access the ferry terminal, and commercial and retail tenancies directly from the east, it is recommended that a facility is provided for pedestrians crossing the access road at Sir Leslie Thiess Drive.

As this is a totally new facility crash information was assessed using the APCFST model and not crash history.

The critical peak for the crossing on the access road will be the morning peak hour with 15 pedestrians and 9 bicycles expected to use the crossing. During this hour development traffic on the access road is expected to be 295vph eastbound and 12vph westbound.

The APCFST assessment for the access road crossing is attached in Appendix J. The base case was assumed to be 'no facility'.

To not provide a facility is the worst option in terms of both perceived safety and crash costs. It is also the worst option for pedestrian level of service but has lower perceived delay and delay costs than signals.

Location of the crossing adjacent to an intersection makes it unsuitable for zebra or grade separated crossings.

Options involving kerb extensions have the lowest perceived delay while options with median refuges have the best safety savings. The best perceived delay and savings for delays and safety are for kerb extensions with median refuge.

Based on the APCFST assessment, the best option appears to be a design which includes a median refuge and provides traffic lanes which are the minimum width required to accommodate the swept path of the design turning vehicle.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary of Impacts and Mitigation Measures

The following points from the preceding discussion respond to the “Further Issues” letter dated 24 June 2019 by EDQ:

- During morning and evening peak hours, the development will generate up to 486 ferry passenger movements, 53 external pedestrian trips, 29 bus passenger movements, 19 bicycle trips and seven (7) taxi passenger movements;
- The most significant desire lines are:
 - Ferry terminal – car park (256pph);
 - Ferry terminal – kiss-and-drop (128pph);
 - Car park – combined commercial and retail tenancies (59pph in the evening peak);
 - Ferry terminal – King Street quarter (40pph);
 - Car park – hotel (32pph in the morning peak);
 - Hotel – porte-cochere (28pph in the evening peak); and
 - Ferry terminal – local / school bus stop (28pph in the morning peak).
- In accordance with the *Public Transport Infrastructure Manual*, allowance has been made for a 12.8m long and 4.2m deep premium stop at both the local / school bus stop on the proposed service lane and the coach / tourist bus stop on Sir Leslie Thiess Drive.
- The concourse between the coach / tourist bus stop and the kiss-and-drop facility is proposed to be 7.5m wide to provide for the 4.2m deep premium stop and a 3.3m wide zone adjacent to the kiss-and-drop facility. The 3.3m wide zone adjacent to the kiss-and-drop facility can be considered to provide a 1.8m wide path and a 1.5m wide waiting zone in addition to the circulation and waiting space provided at the rear of the premium stop within the premium stop footprint;
- The local / school bus stop complies with the minimum requirements of the *Public Transport Infrastructure Manual* for an on-road stop. The local / school bus stop is considered an on-road stop and not an indented stop because buses arriving and departing the stop are restricted by parked vehicles and not solid kerbing;
- The coach / tourist bus stop complies with the minimum requirements of the *Public Transport Infrastructure Manual* for an indented stop;
- Layover bays for long distance coaches are provided on the northern side of the access road with pedestrian access to the development provided along the arbor and waterfront promenade around the access road and porte-cochere;
- A taxi rank will be provided at the eastern end of the Strand to accommodate the peak demand for four (4) passenger pick-ups per hour;
- The taxi rank is separated from the kiss-and-drop area used by private and ride share vehicles, and shuttle bus stops;
- The taxi rank is designed in accordance with the *Public Transport Infrastructure Manual* and *AS2890.5-1993*;
- Pedestrian crossing facilities will be required to support the desire lines for:
 - Pedestrians and bicycles to cross Sir Leslie Thiess Drive at both the northern and southern end of the site to access the Strand and the CBD respectively; and
 - Pedestrians to cross the service lane when moving between the kiss-and-drop facility and bus hub, and the ferry terminal;

- To minimise pedestrians crossing the car park and van park access, it is also recommended that a pedestrian crossing is provided on the access road at Sir Leslie Thiess Drive to direct pedestrian and bicycles approaching the development from the Sir Leslie Thiess Drive northern crossing through the bus hub to the ferry terminal, and commercial and retail tenancies directly;
- Assessments using the Australasian Pedestrian Crossing Facility Selection Tool concluded that for both Sir Leslie Thiess Drive crossings and the access road crossing the most appropriate crossing facility is a median refuge. Also, carriageway widths should be reduced to the minimum required width to accommodate the swept path of the design turning vehicle with provision of one (1) northbound and two (2) southbound lanes on Sir Leslie Thiess Drive; and
- Assessment with the Australasian Pedestrian Crossing Facility Selection Tool concluded that a zebra with platform with kerb extensions is the best option for pedestrians and bicycles crossing the service lane between the kiss-and-drop facility and the ferry terminal. To further improve pedestrian safety on the service lane it is recommended a 20km/h speed limit be imposed on the service lane;
- As local and school buses will use the service lane, design of the platform associated with the service lane crossing should align with relevant standards and guidelines for provision of traffic calming on bus routes.

6.2 Certification Statement and Authorisation

This report was prepared by Bradley Jones (RPEQ 19986).

Traffic Impact Assessment Certification in accordance with the Guide to Traffic Impact Assessment (Transport and Main Roads, December 2018) is attached in Appendix K.

APPENDIX A
EDQ LETTERS



Department of
**State Development,
Manufacturing,
Infrastructure and Planning**

**Received by
Milford Planning
on 18/6/2019**

Our ref: DEV2019/1027

18 June 2019

Honeycombes Property Group
C/- Milford Planning
Att: Sarah Jones
PO Box 5463
TOWNSVILLE QLD 4810

Dear Sarah

SECTION 82 ACCEPTANCE OF PDA DEVELOPMENT APPLICATION FOR A PDA DEVELOPMENT PERMIT FOR A MATERIAL CHANGE OF USE FOR PORT SERVICES, UNDEFINED USE (BUS INTERCHANGE), SHORT TERM ACCOMMODATION (99 ROOMS), FOOD AND DRINK OUTLET, SHOP, EDUCATIONAL ESTABLISHMENT, OFFICE AND PARKING STATION AT 2, 2B, 2C AND 4 THE STRAND, AND 25 SIR LESLIE THIESS DRIVE, TOWNSVILLE DESCRIBED AS LOT 363 ON EP776, LOT 738 ON EP1235, LOT 433 ON EP1121, LOT 613 ON EP1805, LOT 674 ON EP2163 AND LOTS 703, 704 AND 705 ON EP2163 AND ROAD RESERVE (SIR LESLIE THEISS DRIVE)

After undertaking an assessment of this Priority Development Area (PDA) development application, the Minister for Economic Development Queensland (MEDQ) has determined that further information is required to decide the application in accordance with s.83 of the *Economic Development Act 2012* (the Act). The further information required by the MEDQ is detailed below:

1. Traffic and Transport Impact Assessment

Provide a revised Traffic and Transport Impact Assessment that:

- i. is based on:
 - a. recent trip generation rate information; or
 - b. new traffic counts;
- ii. contains forecasting that gives consideration to Council's Townsville Aimsun Integrated Model (TAIM), which forecasts anticipated development growth within the PDA.

Note:

- The Traffic and Transport Impact Assessment Report Number HON0031/R01 Rev.B dated 17 April 2019, prepared by Premise, is based on data obtained from the document Breakwater and Associated Developments: Assessment of Peak Hour Traffic Volumes (TCC Breakwater Report) prepared by C&G Horman Pty Ltd for Council dated 11 December 2007. This data is more than 10 years old.
- Council is able to provide traffic projections for Sir Leslie Thiess Drive across 5 year intervals up to 2036.
- EDQ has additional concerns regarding traffic/transport and design matters that will be sought to be resolved through forthcoming further issues request/s.

Please note that under s.84 of the Act, this application will not be required to undergo notice of application. The MEDQ's decision making period cannot commence until such time as the MEDQ states in writing, that the Information Request has been satisfactorily complied with.

In accordance with s.83(1) of the Act the requested information must be given to the MEDQ within 20 business days from the date of this notice, or a longer period as agreed to between the applicant and MEDQ.

Should you have any queries in relation to the progress of your PDA development application, please do not hesitate to contact Rachael Grimes via email rachael.grimes@dsgmip.qld.gov.au and via phone 07 3452 7098.

Yours sincerely



Anne Edmonds
Manager
Development Assessment
Economic Development Queensland



Department of
**State Development,
Manufacturing,
Infrastructure and Planning**

**Received by
Milford Planning
on 24/6/2019
(4.45pm)**

Our ref: DEV2019/1027

24 June 2019

Honeycombes Property Group
C/- Milford Planning
Att: Sarah Jones
PO Box 5463
TOWNSVILLE QLD 4810

Dear Sarah

SECTION 82 ACCEPTANCE OF PDA DEVELOPMENT APPLICATION FOR A PDA DEVELOPMENT PERMIT FOR A MATERIAL CHANGE OF USE FOR PORT SERVICES, UNDEFINED USE (BUS INTERCHANGE), SHORT TERM ACCOMMODATION (99 ROOMS), FOOD AND DRINK OUTLET, SHOP, EDUCATIONAL ESTABLISHMENT, OFFICE AND PARKING STATION AT 2, 2B, 2C AND 4 THE STRAND, AND 25 SIR LESLIE THIESS DRIVE, TOWNSVILLE DESCRIBED AS LOT 363 ON EP776, LOT 738 ON EP1235, LOT 433 ON EP1121, LOT 613 ON EP1805, LOT 674 ON EP2163, AND LOTS 703, 704 AND 705 ON EP2163 AND ROAD RESERVE (SIR LESLIE THIESS DRIVE)

After undertaking a preliminary assessment of the Priority Development Area (PDA) development application, the Minister for Economic Development Queensland (MEDQ) has identified the following further issues:

TRAFFIC AND TRANSPORT

1. Public Transport Infrastructure Manual (PTIM) 2015

Provide additional information that assesses the proposal against all relevant criteria in PTIM. The response as a minimum should address the sections of PTIM identified below.

Note: To address the public passenger transport items 1a, 1b and 1c, it is anticipated the applicant will either submit:

- submit an updated the Traffic and Transport Impact Assessment (TTIA) report certified by an RPEQ; or*
- Prepare a separate Public Passenger Transport Assessment addressing all relevant aspects of public transport infrastructure, certified by an RPEQ.*

a. Bus stop infrastructure

Provide information that addresses Chapter 5 Bus stop infrastructure, including:

- i. 5.3.6 – sufficient area provided to allow for the provision of all supporting components of a Premium Stop;
- ii. 5.5.1 – the location of the stops provides for accessibility and equitable access (Disability Standard for Accessible Public Transport 2002);
- iii. 5.5.3 – details regarding pedestrian safety and proposed pedestrian crossing points at the driveway for the car park entry / exit location;

- iv. 5.6.3.1 – that buses can be accommodated in accordance with table 5.7;
- v. 5.8 – the bus stop meets the guidelines regarding coach facilities.

Note: Bus stops at the site frontage on Sire Leslie Theiss Drive have been identified by DTMR as a Premium Stop as defined by PTIM.

b. Pedestrian and cyclist demand analysis

Provide a pedestrian and cyclist demand analysis that addresses Chapter 3 Supporting Access Infrastructure. The analysis should:

- i. examine the likely forecast of pedestrians and cyclists from public transport passenger numbers;
- ii. consider the likely forecast of pedestrians and cyclists from other proposed land uses on site;
- iii. provide analysis of the movements between:
 - ferry and bus locations;
 - ferry to taxi and other pick up / drop off locations;
 - bus to taxi and other pick up / drop off locations;
 - movements / desire lines to and from the development with consideration for key destinations;
- iv. identify any necessary pedestrian and cyclist crossing and/or refuge locations;
- v. refer to the following when preparing the cycling demand analysis:
 - PTIM Supporting Access Infrastructure Guideline;
 - DTMR technical notes for cycling design and infrastructure.

c. Taxi infrastructure

Provide a taxi demand analysis that addresses Chapter 7 Taxi Facilities. The analysis should:

- i. examine the likely forecast of taxi passenger numbers;
- ii. identify sufficient space within the development to accommodate anticipated taxi demand;
- iii. identify if taxi areas for the development are designed in accordance with Australian Standards AS2890.6 and AS1428.1
- iv. separate provision of pick up / drop off / waiting areas for taxis from other vehicle types (e.g. shuttle buses, ride share vehicles and private vehicles).

2. Site access manoeuvres

Provide plans and supporting information demonstrating the proposed site access manoeuvres to and from the local road network. The response should address the matters identified below.

Note: To address items 2a and 2b it is anticipated that the applicant will submit a revised TTIA report and revised plans, both certified by an RPEQ.

a. Bus turn around facilities

Provide information that identifies the location of a bus turn around facility for the development. The information provided is to identify how:

- i. the turn around facility will accommodate the swept path of a single unit rigid bus 14.5m in length;
- ii. bus turning movements will be prioritised;
- iii. the bus turning movements will avoid on-site diversion through parking / set down / loading areas;
- iv. the turnaround facility will avoid or minimise diversions, circuitous routes, backtracking and dead running on the local road network.

b. Car / taxi / shuttle bus turning

Provide information that identifies a vehicle turning location for cars, taxis and shuttle buses to enter the car park driveway of the development. The information provided is to identify:

- i. turning location in proximity to the development;
- ii. how the turning location will avoid or minimise diversions, circuitous routes and backtracking on the local road network.

3. Car park entry / exit – sightlines

Provide a sightline assessment for the car park entry / exit location that identifies and considers the proposed built environment, including assessment of the scenario where buses are standing in the bus bays on Sir Leslie Theiss Drive. This assessment should be carried out in accordance with:

- a. the Guide to Traffic impact Assessment (GTIA) December 2018;
- b. Austroads 2017.

Note: The use of figures visually depicting the assessment to demonstrate acceptable sightlines in all situations is recommended.

4. Car park - out ramp

Demonstrate the proposed queuing distance on the curved out-ramp of the car park (between level 1 and the boom gate on ground level) complies with the following Australian Standards:

- a. AS2890 Parking Facilities;
- b. AS1428 Design for Access and Mobility.

5. Pedestrian crossing / refuge locations

Provide analysis demonstrating the appropriateness of the proposed pedestrian crossing and pedestrian refuge island identified on Roadworks Layout Plan contained in Appendix D of the TTIA report, having regard to:

- a. pedestrian and cyclist desire lines;
- b. location of driveways;
- c. location of intersections;
- d. any change in crossing or refuge locations that may be proposed following the pedestrian and cyclist demand analysis (item 1b).

PUBLIC REALM / GROUND FLOOR

6. Waterfront Promenade

Revise the design of the waterfront promenade to:

- a. increase the width of the promenade (a minimum width of 4m is recommended);
- b. reduce the structural encroachments within the movement corridor of the promenade (e.g. landscaping, 'switchback' access points);
- c. provide for a range of anticipated promenade users, including but not limited to:
 - i. pedestrians and cyclists for recreation purposes;
 - ii. pedestrian and cyclists for commuter or travel purposes;
 - iii. luggage, freight and goods movement between the development and proposed future ferry locations;
- d. provide direct routes and improved wayfinding between the following parts of the development:
 - i. ferries;
 - ii. buses;
 - iii. vehicle pick up and drop off locations;
 - iv. bicycle parking and end of trip facilities;
 - v. pedestrian routes towards the CBD and other identified key destinations;

- e. provide detail about how the waterfront promenade will connect to The Strand, noting the civic plaza intent for the section of The Strand adjoining Ross Creek;
- f. considering the intent for the waterfront promenade as identified in the following documents for the Townsville City Waterfront PDA:
 - i. Development Scheme;
 - ii. Design Guideline;
 - iii. Inspiration Guideline.

7. Activation and active uses

Provide amended plans that demonstrate how the development will provide improved activation, including day and night activation. The revised proposal should demonstrate how the development will:

- a. achieve improved overlooking and casual surveillance of the public realm at the ground level and from upper levels of the building;
- b. increase activation and/or active uses fronting:
 - i. Sir Leslie Theiss Drive
 - ii. the waterfront promenade
- c. promote Crime Prevention through Environmental Design (CPTED) principles for people/passenger movement routes through and adjoining the development.

Note: The applicant is encouraged to consider options such as:

- *relocate the Sealink offices to another floor of the building in a manner that supports overlooking of Sir Leslie Theiss Drive or the waterfront promenade;*
- *re-design the Sealink waiting area to have an active frontage to Sir Leslie Theiss Drive;*
- *Introduce active uses to part sleeve the car park (e.g. residential, commercial, mixed uses on level 1 and 2 of the building)*
- *Re-design the proposed link through the site (currently adjoining the proposed taxi/shuttle drop off zone) to be a central feature of the ground floor layout in terms of design and presentation.*

8. Ground floor - function

- a. Revise the design of the ground floor of the development to:
 - i. cater for pedestrian and cyclist routes as identified by the pedestrian and cyclist demand analysis (refer item 1b);
 - ii. demonstrate that pedestrian and cyclist connections through the site are easily identified, accessible, convenient and of a suitable width;
 - iii. ensure the built form around pedestrian and cyclist routes is designed to embody CPTED principles.

Note: The proposed link through the site (currently adjoining the proposed taxi/shuttle drop off zone) is of concern from a presentation, convenience, way finding, circulation and CPTED viewpoint.

- b. Demonstrate how access to on site facilities and services, such as toilets, cycle parking and end of trip facilities, will be safe, secure and available to the public at all times.

9. The Strand – indicative street design

Provide an indicative street design for The Strand between Sir Leslie Thiess Drive and Ross Creek. The indicative design is to:

- a. consider the changed operation of this section of The Strand upon the closure of 'Breakwater Road' for all movement types;
- b. identify an indicative plaza area of approximately 20m in depth as measured from the proposed waterfront promenade on Ross Creek;

- c. accommodate existing driveway locations and vehicle movements to the southern side of The Strand;
- d. identify any proposed pick up or drop off areas (if proposed);
- e. identify any waste storage or collection locations (if proposed);
- f. indicate landscaping, surface treatments and similar design details;
- g. identify any streetscape works or road upgrades works included in this indicative design that are triggered as a result of the proposed development.

10. Public art

Provide details of public art to be provided as part of the development.

Note: Public art should be proposed with reference to section 3.6 of the Townsville City Waterfront PDA Design Guideline.

BUILT FORM AND DESIGN

11. Sections

Provide detailed section drawings to accompany the architectural plans submitted for the application.

12. Schedule of materials and finishes

Provide a schedule of materials and finishes for all building facades.

13. Hotel room orientation

Demonstrate the suitability of the orientation of hotel room type A, adjacent to the fire stairs.

14. Pedestrian lighting

Provide an assessment against section 3.5.3. of the Townsville City Waterfront PDA Design Guideline identifying proposed pedestrian lighting.

Note: Any proposed pedestrian lighting should consider criteria in PTIM and CPTED principles.

15. Architectural lighting

Provide an assessment against section 3.5.4 of the Townsville City Waterfront PDA Design Guideline for any proposed architectural lighting.

Note: Any proposed architectural lighting should:

- *be directed away from the navigable channel;*
- *not incorporate coloured light that may interfere with the airport environment;*
- *be designed to comply with Australian Standard AS 4282-1997 Control of the obtrusive effects of outdoor lighting.*

16. Screening of services and plant

Provide plans that include specific details of all screening proposed as part of the development, including screening of services and plant at ground level and on roofs.

17. Sustainable Building

Provide an assessment against section 3.1.5 of the Townsville City Waterfront PDA Design Guideline identifying how the development will achieve the identified sustainable building practices.

18. Landscaping

Provide amended or additional landscape concept plans that demonstrate the building design can support and maintain any landscaping established above the ground floor, including cascading plants on the hotel facades as illustrated on render drawings submitted with the application. This information should include details regarding soil depth/volume and watering systems.

GENERAL

19. Waste management

Provide a waste management strategy or information for the site, including details about how:

- a. waste bins will be moved from storage areas to collection areas;
- b. waste collection activities will be planned and managed to avoid impacts on the public transport and pedestrian functions of the development, including parking areas and the pick up / drop off zone within the development.

STATE INTERESTS

20. Storm tide inundation – plant and fuel storage

Provide plans that demonstrate that the fuel storage area, LPG storage, Ergon transformer will be established at or above the storm tide inundation level of 3.9m.

Should you have any queries in relation to this further issues letter, please do not hesitate to contact Rachael Grimes on 3452 7098 or via email at rachael.grimes@dsdmip.qld.gov.au

Yours sincerely



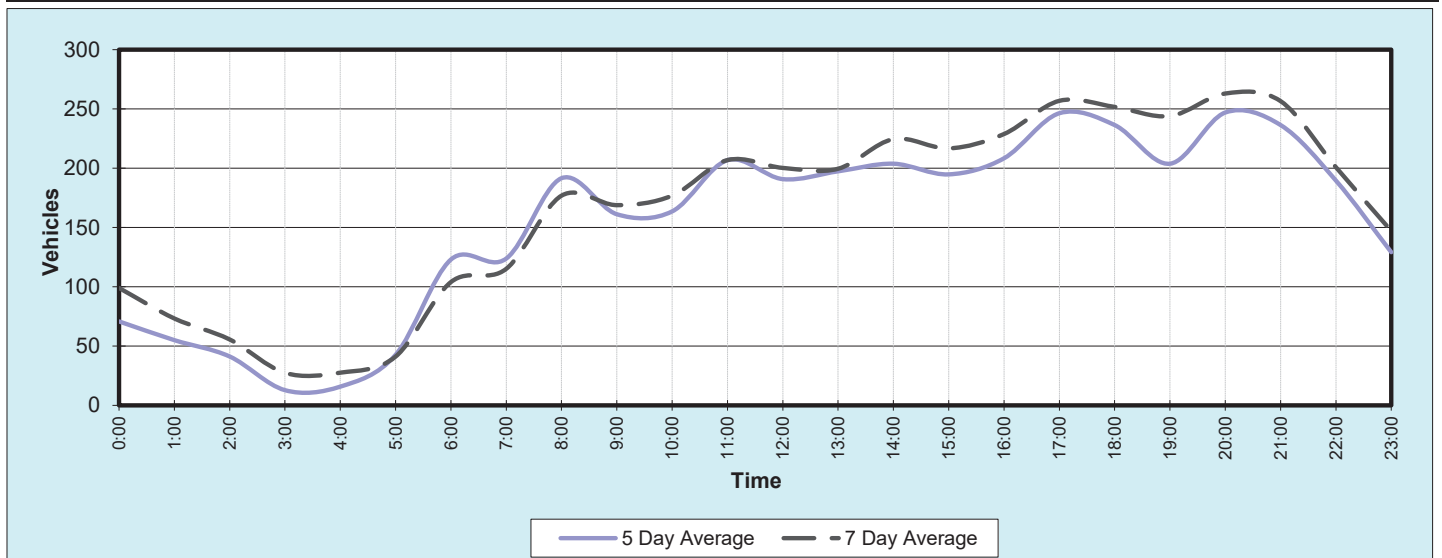
Anne Edmonds
Manager
Development Assessment
Economic Development Queensland

APPENDIX B
APRIL 2016 TRAFFIC COUNTS

Volume Summary

Street	Sir Leslie Thiess Drive			<table><tr><td>5 Day Average</td><td>3692</td></tr><tr><td>7 Day Average</td><td>3963</td></tr><tr><td>5 Day Heavy (Class 3 to 12)</td><td>38.8%</td></tr><tr><td>7 Day Heavy (Class 3 to 12)</td><td>38.0%</td></tr></table>	5 Day Average	3692	7 Day Average	3963	5 Day Heavy (Class 3 to 12)	38.8%	7 Day Heavy (Class 3 to 12)	38.0%
5 Day Average	3692											
7 Day Average	3963											
5 Day Heavy (Class 3 to 12)	38.8%											
7 Day Heavy (Class 3 to 12)	38.0%											
Suburb	Townsville											
Location	North of Sunferries											
Count No.	SG21											
Start Date	Thursday	14-Apr-16	Speed Limit 50 km/h									
Direction	Bidirectional		Lat/Long -19.253444, 146.826256									

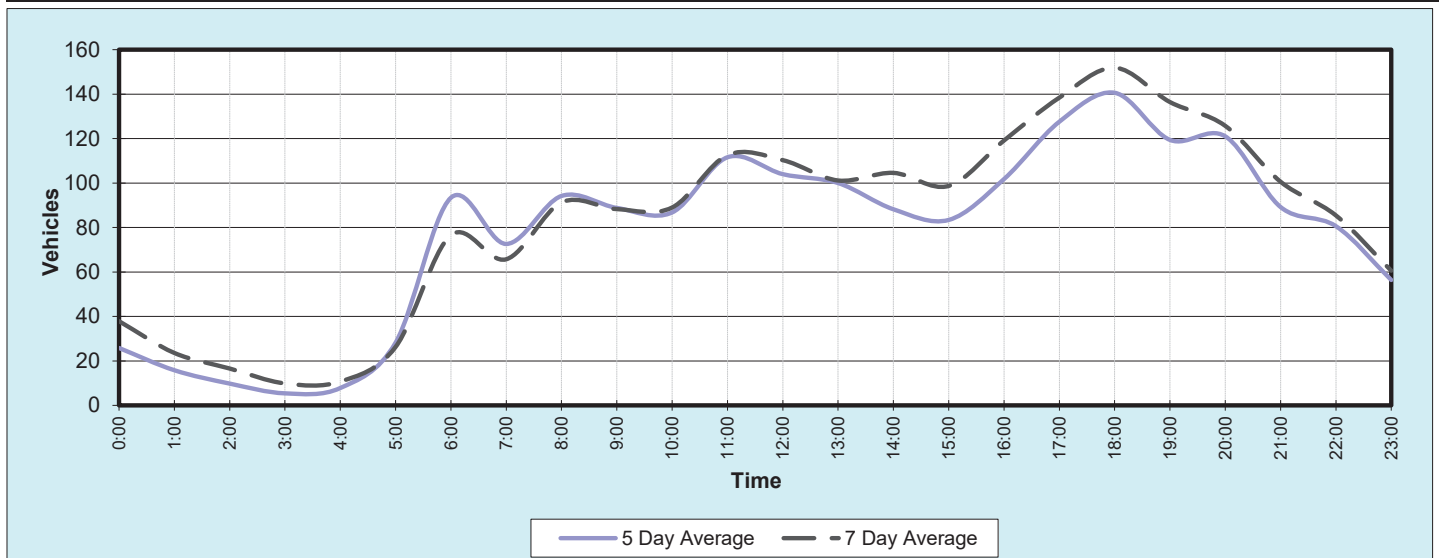
Time	Day of Week - Class 1 to 12							5 Day Average	7 Day Average
	Mon 18-Apr	Tue 19-Apr	Wed 20-Apr	Thu 14-Apr	Fri 15-Apr	Sat 16-Apr	Sun 17-Apr		
AM Peak	170	296	180	162	259	199	229		
PM Peak	220	267	321	308	285	389	311		
0:00	97	50	71	62	74	148	191	71	99
1:00	54	60	59	54	48	101	137	55	73
2:00	34	30	42	56	44	97	86	41	56
3:00	9	5	22	14	14	63	65	13	27
4:00	7	15	19	14	24	57	57	16	28
5:00	28	56	52	38	39	36	39	43	41
6:00	70	272	108	79	86	51	62	123	104
7:00	110	126	129	116	138	91	96	124	115
8:00	143	296	153	150	216	141	139	192	177
9:00	141	187	169	144	165	171	205	161	169
10:00	149	192	156	142	179	199	221	164	177
11:00	170	263	180	162	259	185	229	207	207
12:00	169	219	195	179	192	231	217	191	200
13:00	164	261	217	163	182	209	201	197	200
14:00	169	244	184	201	221	258	295	204	225
15:00	155	188	197	203	231	240	303	195	217
16:00	189	224	216	203	210	249	311	208	229
17:00	220	250	298	206	258	281	285	246	257
18:00	198	267	289	193	235	358	222	236	252
19:00	169	196	237	174	243	380	309	204	244
20:00	209	245	321	227	233	349	257	247	263
21:00	148	243	286	308	197	389	225	236	257
22:00	123	162	192	186	285	306	152	190	201
23:00	78	109	94	128	237	289	95	129	147
Total	3003	4160	3886	3402	4010	4879	4399	3692	3963
Heavy %	39.1%	37.8%	38.1%	39.4%	39.5%	37.7%	35.3%	38.8%	38.0%



Volume Summary

Street	Sir Leslie Thiess Drive					5 Day Average	1852
Suburb	Townsville					7 Day Average	1981
Location	North of Sunferries					5 Day Heavy (Class 3 to 12)	72.4%
Count No.	SG21					7 Day Heavy (Class 3 to 12)	72.2%
Start Date	Thursday	14-Apr-16	Speed Limit 50 km/h				
Direction	Northbound		Lat/Long -19.253444, 146.826256				

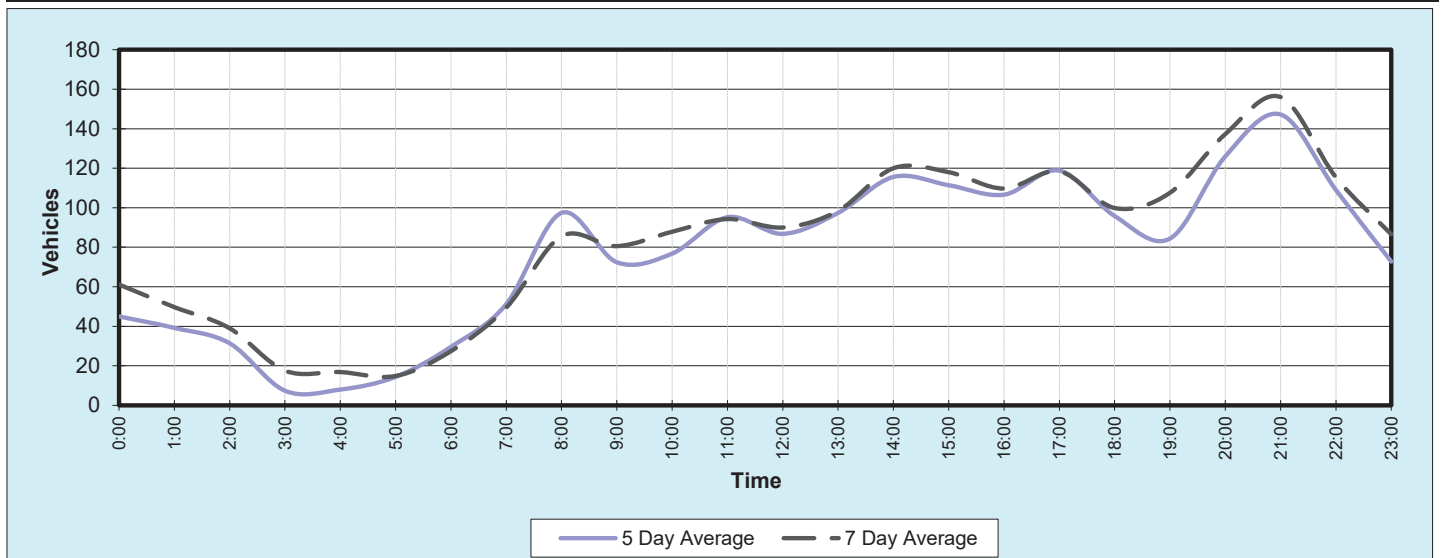
Time	Day of Week - Class 1 to 12							5 Day Average	7 Day Average
	Mon 18-Apr	Tue 19-Apr	Wed 20-Apr	Thu 14-Apr	Fri 15-Apr	Sat 16-Apr	Sun 17-Apr		
AM Peak	83	239	103	99	129	105	125		
PM Peak	112	146	192	126	150	237	188		
0:00	42	20	22	22	23	61	75	26	38
1:00	13	19	19	14	14	36	50	16	24
2:00	7	5	9	16	12	39	28	10	17
3:00	3	3	10	5	6	23	19	5	10
4:00	2	10	9	8	10	18	18	8	11
5:00	19	40	33	22	27	20	23	28	26
6:00	49	239	72	48	59	34	35	93	77
7:00	65	72	71	61	94	49	48	73	66
8:00	81	81	91	99	119	91	77	94	91
9:00	80	100	101	78	85	85	89	89	88
10:00	77	110	81	77	89	97	92	87	89
11:00	83	154	103	89	129	105	125	112	113
12:00	94	117	107	102	100	122	130	104	110
13:00	92	132	104	82	90	97	111	100	101
14:00	64	103	75	89	110	130	161	88	105
15:00	73	78	85	81	100	122	152	83	99
16:00	80	103	102	112	112	137	188	102	119
17:00	112	123	161	103	139	177	154	128	138
18:00	104	146	192	126	135	229	131	141	152
19:00	88	112	145	102	150	237	121	119	136
20:00	96	113	160	121	115	174	101	121	126
21:00	65	103	79	112	87	167	91	89	101
22:00	51	69	66	84	133	122	73	81	85
23:00	39	45	35	51	112	108	34	56	61
Total	1479	2097	1932	1704	2050	2480	2126	1852	1981
Heavy %	73.4%	71.1%	71.8%	73.2%	72.8%	72.3%	71.6%	72.4%	72.2%



Volume Summary

Street	Sir Leslie Thiess Drive					5 Day Average	1840
Suburb	Townsville					7 Day Average	1982
Location	North of Sunferries					5 Day Heavy (Class 3 to 12)	4.9%
Count No.	SG21					7 Day Heavy (Class 3 to 12)	3.8%
Start Date	Thursday	14-Apr-16	Speed Limit 50 km/h				
Direction	Southbound		Lat/Long -19.253444, 146.826256				

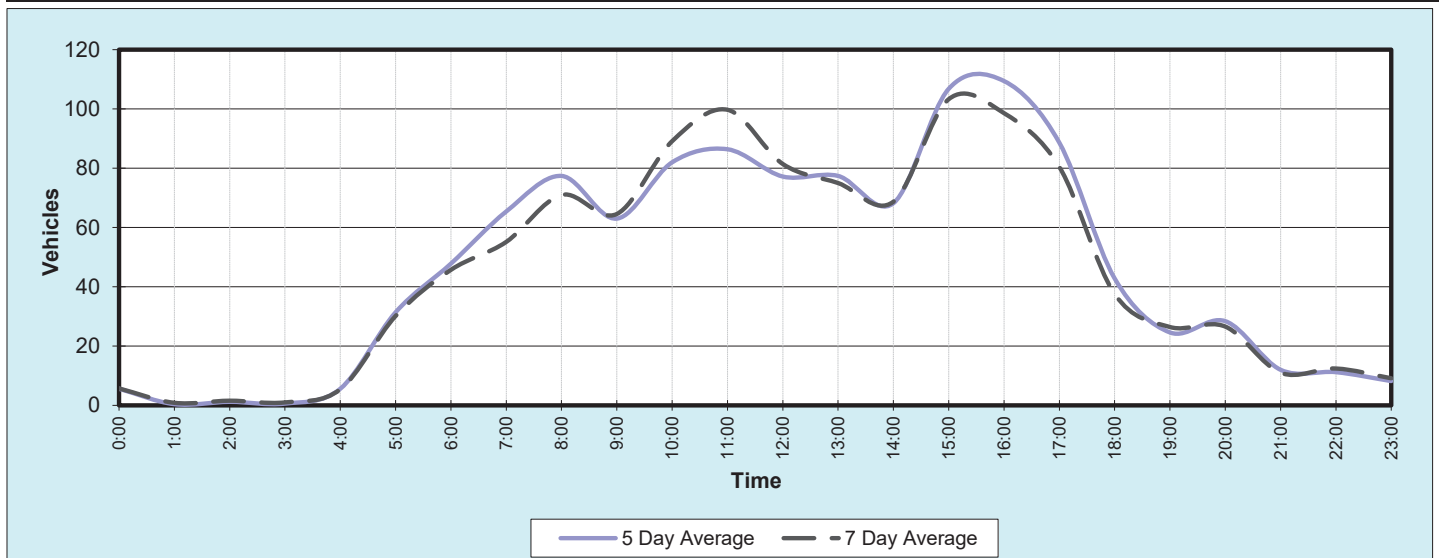
Time	Day of Week - Class 1 to 12							5 Day Average	7 Day Average
	Mon 18-Apr	Tue 19-Apr	Wed 20-Apr	Thu 14-Apr	Fri 15-Apr	Sat 16-Apr	Sun 17-Apr		
AM Peak	87	215	77	73	130	102	129		
PM Peak	113	141	207	196	152	222	188		
0:00	55	30	49	40	51	87	116	45	61
1:00	41	41	40	40	34	65	87	39	50
2:00	27	25	33	40	32	58	58	31	39
3:00	6	2	12	9	8	40	46	7	18
4:00	5	5	10	6	14	39	39	8	17
5:00	9	16	19	16	12	16	16	14	15
6:00	21	33	36	31	27	17	27	30	27
7:00	45	54	58	55	44	42	48	51	49
8:00	62	215	62	51	97	50	62	97	86
9:00	61	87	68	66	80	86	116	72	81
10:00	72	82	75	65	90	102	129	77	88
11:00	87	109	77	73	130	80	104	95	94
12:00	75	102	88	77	92	109	87	87	90
13:00	72	129	113	81	92	112	90	97	98
14:00	105	141	109	112	111	128	134	116	120
15:00	82	110	112	122	131	118	151	111	118
16:00	109	121	114	91	98	112	123	107	110
17:00	108	127	137	103	119	104	131	119	118
18:00	94	121	97	67	100	129	91	96	100
19:00	81	84	92	72	93	143	188	84	108
20:00	113	132	161	106	118	175	156	126	137
21:00	83	140	207	196	110	222	134	147	156
22:00	72	93	126	102	152	184	79	109	115
23:00	39	64	59	77	125	181	61	73	87
Total	1524	2063	1954	1698	1960	2399	2273	1840	1982
Heavy %	5.8%	4.1%	4.9%	5.5%	4.6%	1.9%	1.5%	4.9%	3.8%



Volume Summary

Street	Sunferries/Long Distance Bus						
Suburb	Townsville					5 Day Average	1122
Location	NB carpark					7 Day Average	1101
Count No.	SG12					5 Day Heavy (Class 3 to 12)	15.3%
Start Date	Sunday	17-Apr-16	Speed Limit	10 km/h		7 Day Heavy (Class 3 to 12)	13.9%
Direction	Bidirectional		Lat/Long	-19.254470, 146.825773			

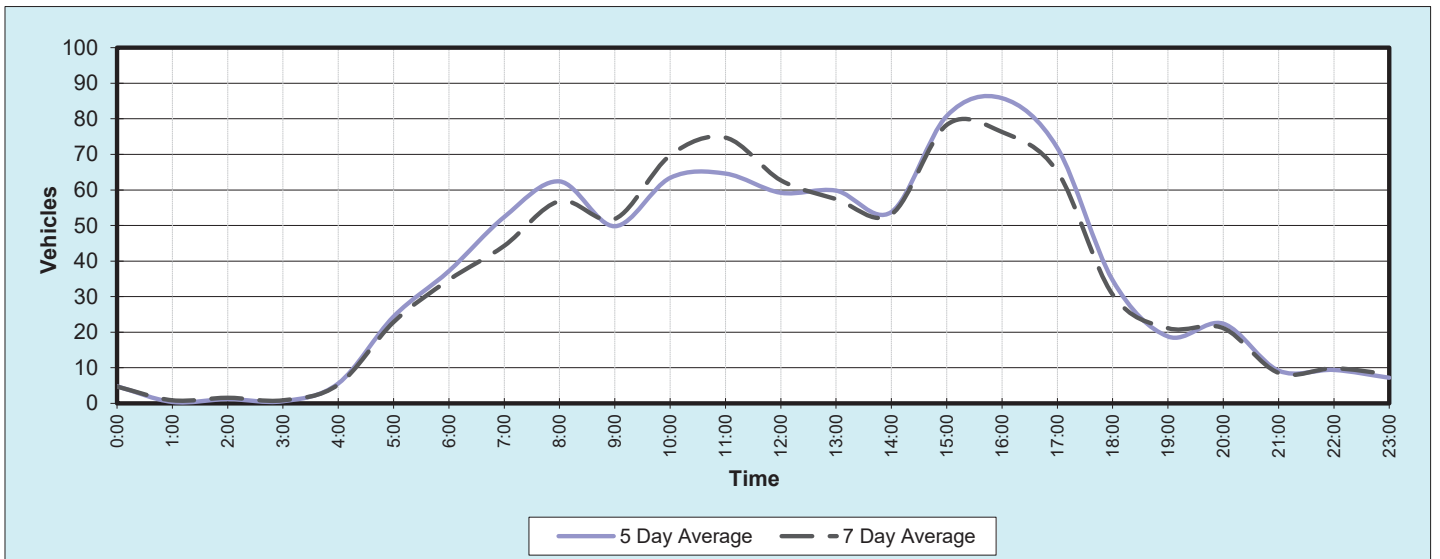
Time	Day of Week - Class 1 to 12							5 Day Average	7 Day Average
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	18-Apr	19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	17-Apr		
AM Peak	94	76	71	85	123	154	112		
PM Peak	96	100	110	127	144	115	86		
0:00	7	4	4	7	6	4	8	6	6
1:00	0	1	0	0	1	3	1	0	1
2:00	2	0	1	1	2	3	2	1	2
3:00	1	1	1	0	0	2	2	1	1
4:00	3	6	6	7	6	7	3	6	5
5:00	30	25	37	33	32	26	28	31	30
6:00	47	48	48	50	46	55	26	48	46
7:00	58	56	71	68	74	35	24	65	55
8:00	73	76	57	74	107	72	38	77	71
9:00	66	53	55	54	87	71	66	63	65
10:00	94	73	62	85	96	129	85	82	89
11:00	94	73	66	76	123	154	112	86	100
12:00	56	68	95	79	88	115	69	77	81
13:00	72	54	78	84	99	78	60	77	75
14:00	51	51	76	72	91	91	49	68	69
15:00	92	88	101	127	126	103	86	107	103
16:00	96	100	87	120	144	87	56	109	99
17:00	77	70	110	88	98	60	60	89	80
18:00	36	44	70	30	34	16	33	43	38
19:00	27	22	18	32	24	28	34	25	26
20:00	14	19	27	41	41	30	14	28	27
21:00	7	16	15	12	10	8	9	12	11
22:00	2	13	13	9	19	22	9	11	12
23:00	3	8	7	10	13	16	7	8	9
Total	1008	969	1105	1159	1367	1215	881	1122	1101
Heavy %	17.7%	16.0%	14.6%	15.5%	13.3%	9.9%	10.7%	15.3%	13.9%



Volume Summary

Street	Sunferries/Long Distance Bus						
Suburb	Townsville					5 Day Average	880
Location	NB carpark					7 Day Average	861
Count No.	SG12					5 Day Heavy (Class 3 to 12)	19.4%
Start Date	Sunday	17-Apr-16	Speed Limit	10 km/h		7 Day Heavy (Class 3 to 12)	17.7%
Direction	Eastbound		Lat/Long	-19.254470, 146.825773			

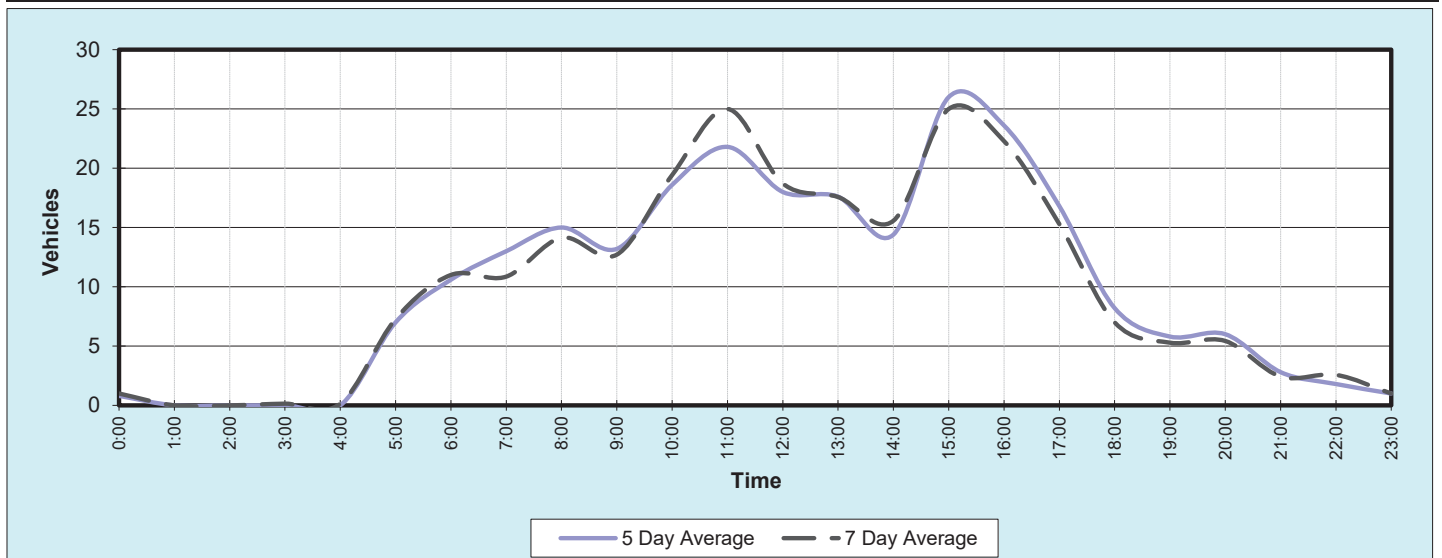
Time	Day of Week - Class 1 to 12							5 Day Average	7 Day Average
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	18-Apr	19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	17-Apr		
AM Peak	73	60	60	64	87	115	85		
PM Peak	75	81	90	98	110	90	67		
0:00	6	4	4	5	5	3	6	5	5
1:00	0	1	0	0	1	3	1	0	1
2:00	2	0	1	1	2	3	2	1	2
3:00	1	1	1	0	0	1	2	1	1
4:00	3	6	6	7	6	6	3	6	5
5:00	24	19	25	28	26	18	20	24	23
6:00	39	36	35	37	39	38	19	37	35
7:00	46	46	60	54	56	29	19	52	44
8:00	59	60	45	62	86	56	30	62	57
9:00	52	43	46	44	64	60	54	50	52
10:00	72	57	50	64	74	102	69	63	70
11:00	73	54	50	59	87	115	85	65	75
12:00	44	56	72	59	65	90	53	59	63
13:00	55	42	58	64	80	58	45	60	57
14:00	44	40	56	55	74	64	39	54	53
15:00	71	64	79	98	92	77	67	81	78
16:00	75	81	70	93	110	66	39	86	76
17:00	62	55	90	71	81	50	47	72	65
18:00	28	36	56	26	27	14	27	35	31
19:00	21	16	13	25	19	25	29	19	21
20:00	12	17	21	32	30	24	12	22	21
21:00	6	12	13	7	8	7	7	9	9
22:00	2	13	11	8	13	16	6	9	10
23:00	3	7	5	10	11	15	6	7	8
Total	800	766	867	909	1056	940	687	880	861
Heavy %	22.1%	20.2%	18.6%	19.8%	17.2%	12.8%	13.7%	19.4%	17.7%



Volume Summary

Street	Sunferries/Long Distance Bus						
Suburb	Townsville					5 Day Average	242
Location	NB carpark					7 Day Average	240
Count No.	SG12					5 Day Heavy (Class 3 to 12)	0.1%
Start Date	Sunday	17-Apr-16	Speed Limit	10 km/h		7 Day Heavy (Class 3 to 12)	0.1%
Direction	Westbound		Lat/Long	-19.254470, 146.825773			

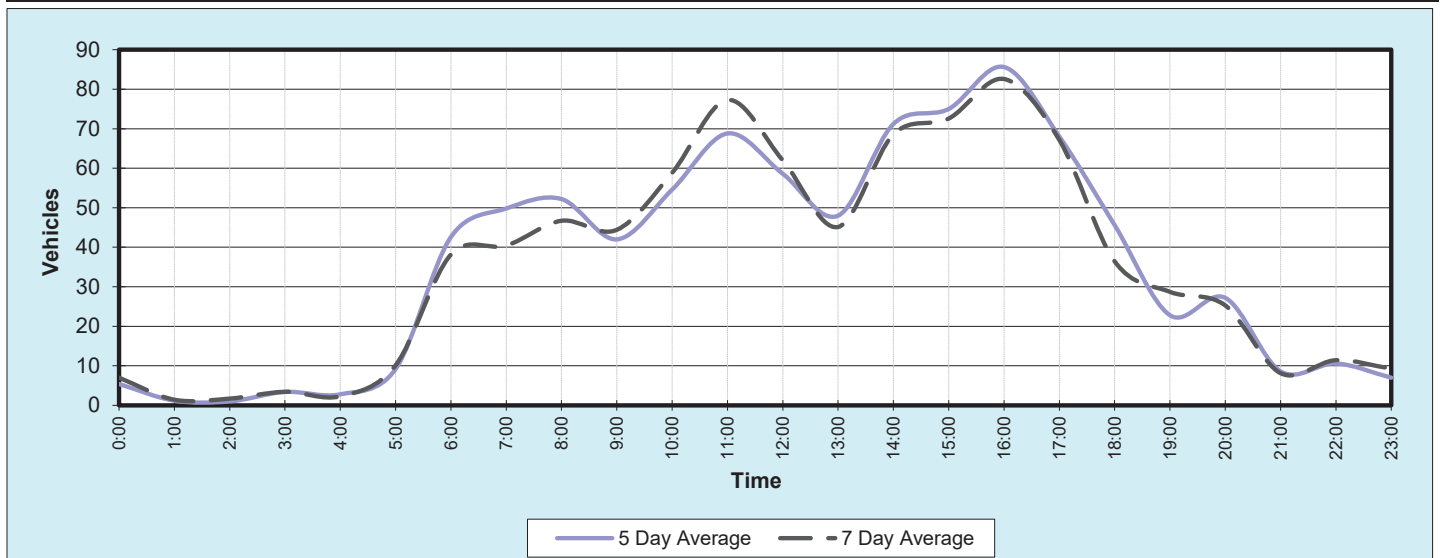
Time	Day of Week - Class 1 to 12							5 Day Average	7 Day Average
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	18-Apr	19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	17-Apr		
AM Peak	22	19	16	21	36	39	27		
PM Peak	21	24	23	29	34	27	19		
0:00	1	0	0	2	1	1	2	1	1
1:00	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	1	0	0	0
4:00	0	0	0	0	0	1	0	0	0
5:00	6	6	12	5	6	8	8	7	7
6:00	8	12	13	13	7	17	7	11	11
7:00	12	10	11	14	18	6	5	13	11
8:00	14	16	12	12	21	16	8	15	14
9:00	14	10	9	10	23	11	12	13	13
10:00	22	16	12	21	22	27	16	19	19
11:00	21	19	16	17	36	39	27	22	25
12:00	12	12	23	20	23	25	16	18	19
13:00	17	12	20	20	19	20	15	18	18
14:00	7	11	20	17	17	27	10	14	16
15:00	21	24	22	29	34	26	19	26	25
16:00	21	19	17	27	34	21	17	24	22
17:00	15	15	20	17	17	10	13	17	15
18:00	8	8	14	4	7	2	6	8	7
19:00	6	6	5	7	5	3	5	6	5
20:00	2	2	6	9	11	6	2	6	5
21:00	1	4	2	5	2	1	2	3	2
22:00	0	0	2	1	6	6	3	2	3
23:00	0	1	2	0	2	1	1	1	1
Total	208	203	238	250	311	275	194	242	240
Heavy %	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%



Volume Summary

Street	Sunferries/Long Distance Bus				<table><tr><td>5 Day Average</td><td>861</td></tr><tr><td>7 Day Average</td><td>849</td></tr><tr><td>5 Day Heavy (Class 3 to 12)</td><td>15.9%</td></tr><tr><td>7 Day Heavy (Class 3 to 12)</td><td>14.9%</td></tr></table>		5 Day Average	861	7 Day Average	849	5 Day Heavy (Class 3 to 12)	15.9%	7 Day Heavy (Class 3 to 12)	14.9%
5 Day Average	861													
7 Day Average	849													
5 Day Heavy (Class 3 to 12)	15.9%													
7 Day Heavy (Class 3 to 12)	14.9%													
Suburb	Townsville													
Location	SB carpark													
Count No.	SG12													
Start Date	Sunday	17-Apr-16	Speed Limit	10 km/h										
Direction	Bidirectional		Lat/Long	-19.254974, 146.825534										

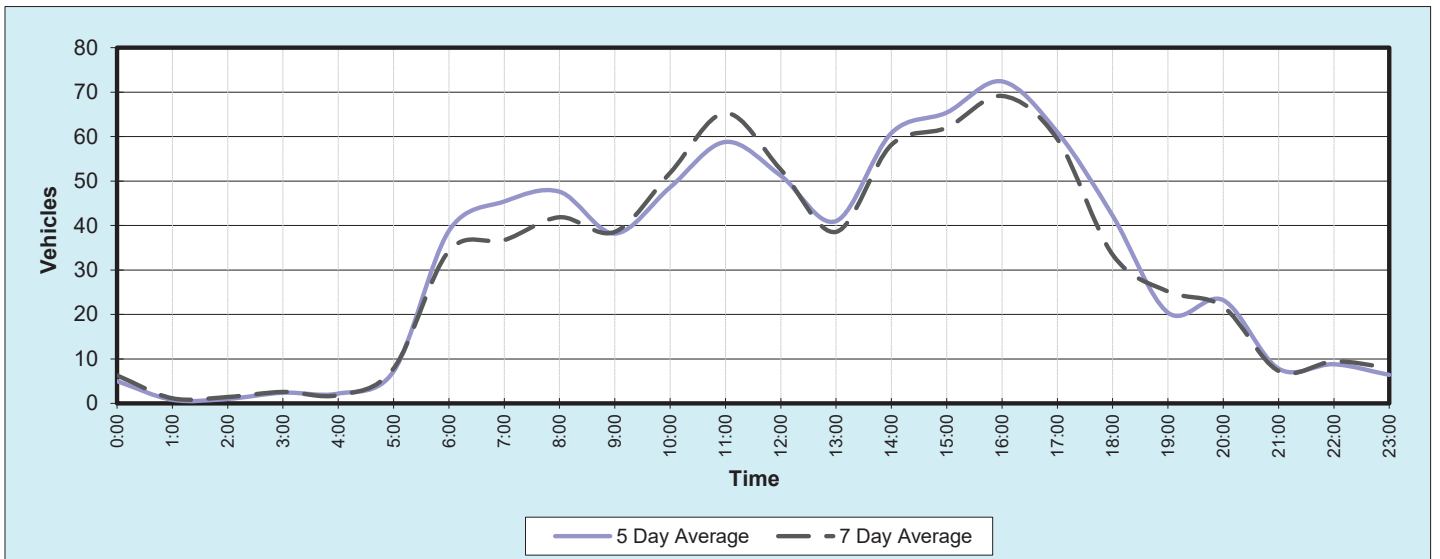
Time	Day of Week - Class 1 to 12							5 Day Average	7 Day Average
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	18-Apr	19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	17-Apr		
AM Peak	70	57	60	58	101	118	79		
PM Peak	86	70	80	97	123	86	64		
0:00	4	3	7	6	7	13	9	5	7
1:00	0	3	0	0	3	3	1	1	1
2:00	1	0	1	1	2	3	4	1	2
3:00	3	2	4	5	3	5	2	3	3
4:00	2	1	2	3	6	1	1	3	2
5:00	6	7	13	11	9	12	13	9	10
6:00	55	45	34	41	38	33	21	43	38
7:00	48	44	60	47	50	19	15	50	40
8:00	56	46	45	52	62	34	32	52	47
9:00	43	33	39	41	54	42	59	42	44
10:00	65	45	38	55	70	71	68	55	59
11:00	70	57	58	58	101	118	79	69	77
12:00	46	50	71	58	68	84	57	59	62
13:00	50	34	54	50	52	37	39	48	45
14:00	62	53	80	77	84	75	49	71	69
15:00	59	70	79	73	94	71	62	75	73
16:00	73	63	72	97	123	86	64	86	83
17:00	86	53	62	68	71	68	62	68	67
18:00	39	52	46	38	53	10	17	46	36
19:00	22	20	21	25	26	34	53	23	29
20:00	16	17	45	26	32	29	12	27	25
21:00	10	9	10	6	8	8	6	9	8
22:00	4	12	12	13	12	23	4	11	11
23:00	4	8	6	9	8	23	7	7	9
Total	824	727	859	860	1036	902	736	861	849
Heavy %	14.3%	19.1%	16.2%	17.8%	13.1%	11.6%	12.8%	15.9%	14.9%



Volume Summary

Street	Sunferries/Long Distance Bus						
Suburb	Townsville					5 Day Average	757
Location	SB carpark					7 Day Average	735
Count No.	SG12					5 Day Heavy (Class 3 to 12)	18.0%
Start Date	Sunday	17-Apr-16	Speed Limit	10 km/h		7 Day Heavy (Class 3 to 12)	17.1%
Direction	Eastbound		Lat/Long	-19.254974, 146.825534			

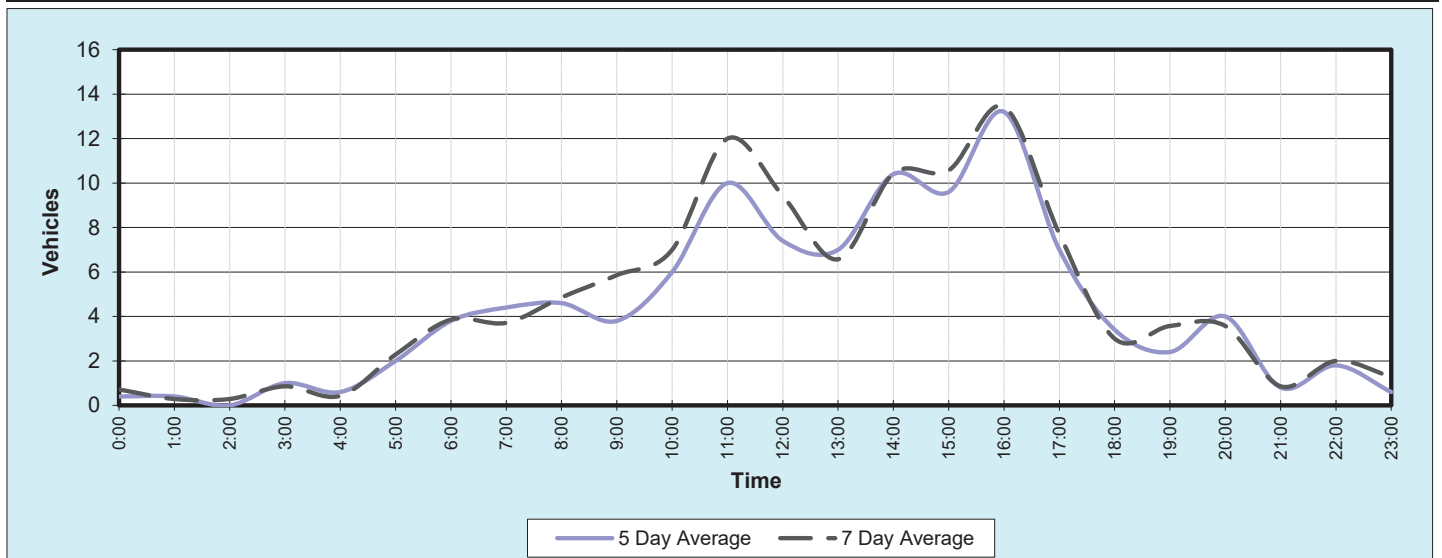
Time	Day of Week - Class 1 to 12							5 Day Average	7 Day Average
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	18-Apr	19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	17-Apr		
AM Peak	63	47	56	51	82	95	68		
PM Peak	78	67	69	83	95	69	55		
0:00	4	3	6	5	7	10	9	5	6
1:00	0	2	0	0	2	3	1	1	1
2:00	1	0	1	1	2	2	3	1	1
3:00	2	2	3	3	2	5	1	2	3
4:00	2	1	2	2	4	1	1	2	2
5:00	4	5	11	9	7	10	9	7	8
6:00	48	40	32	37	37	28	18	39	34
7:00	44	40	56	43	44	17	13	45	37
8:00	50	43	43	47	55	28	27	48	42
9:00	40	30	36	35	50	31	48	38	39
10:00	56	41	34	49	63	59	61	49	52
11:00	63	47	51	51	82	95	68	59	65
12:00	40	47	63	50	56	66	46	51	53
13:00	40	30	45	44	46	30	35	41	39
14:00	51	46	65	69	73	60	43	61	58
15:00	55	67	69	61	75	55	52	65	62
16:00	69	53	62	83	95	69	53	72	69
17:00	78	47	60	61	59	56	55	61	59
18:00	37	47	43	36	48	8	15	42	33
19:00	19	19	21	21	22	28	46	20	25
20:00	14	15	40	24	23	24	12	23	22
21:00	8	8	9	6	8	7	5	8	7
22:00	3	10	10	11	10	19	3	9	9
23:00	4	7	6	9	6	17	7	6	8
Total	732	650	768	757	876	728	631	757	735
Heavy %	16.1%	21.2%	18.0%	19.9%	15.4%	14.4%	14.7%	18.0%	17.1%



Volume Summary

Street	Sunferries/Long Distance Bus				<table><tr><td>5 Day Average</td><td>105</td></tr><tr><td>7 Day Average</td><td>115</td></tr><tr><td>5 Day Heavy (Class 3 to 12)</td><td>1.0%</td></tr><tr><td>7 Day Heavy (Class 3 to 12)</td><td>0.7%</td></tr></table>		5 Day Average	105	7 Day Average	115	5 Day Heavy (Class 3 to 12)	1.0%	7 Day Heavy (Class 3 to 12)	0.7%
5 Day Average	105													
7 Day Average	115													
5 Day Heavy (Class 3 to 12)	1.0%													
7 Day Heavy (Class 3 to 12)	0.7%													
Suburb	Townsville													
Location	SB carpark													
Count No.	SG12													
Start Date	Sunday	17-Apr-16	Speed Limit	10 km/h										
Direction	Westbound		Lat/Long	-19.254974, 146.825534										

Time	Day of Week - Class 1 to 12							5 Day Average	7 Day Average
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	18-Apr	19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	17-Apr		
AM Peak	9	10	7	7	19	23	11		
PM Peak	11	10	15	14	28	18	11		
0:00	0	0	1	1	0	3	0	0	1
1:00	0	1	0	0	1	0	0	0	0
2:00	0	0	0	0	0	1	1	0	0
3:00	1	0	1	2	1	0	1	1	1
4:00	0	0	0	1	2	0	0	1	0
5:00	2	2	2	2	2	2	4	2	2
6:00	7	5	2	4	1	5	3	4	4
7:00	4	4	4	4	6	2	2	4	4
8:00	6	3	2	5	7	6	5	5	5
9:00	3	3	3	6	4	11	11	4	6
10:00	9	4	4	6	7	12	7	6	7
11:00	7	10	7	7	19	23	11	10	12
12:00	6	3	8	8	12	18	11	7	9
13:00	10	4	9	6	6	7	4	7	7
14:00	11	7	15	8	11	15	6	10	10
15:00	4	3	10	12	19	16	10	10	11
16:00	4	10	10	14	28	17	11	13	13
17:00	8	6	2	7	12	12	7	7	8
18:00	2	5	3	2	5	2	2	3	3
19:00	3	1	0	4	4	6	7	2	4
20:00	2	2	5	2	9	5	0	4	4
21:00	2	1	1	0	0	1	1	1	1
22:00	1	2	2	2	2	4	1	2	2
23:00	0	1	0	0	2	6	0	1	1
Total	92	77	91	103	160	174	105	105	115
Heavy %	0.0%	1.3%	1.1%	1.9%	0.6%	0.0%	1.0%	1.0%	0.7%



APPENDIX C
DEVELOPMENT SITE PLAN

Code	Description
	Legend - Hotel Room



CONTACT DETAILS
 WEB: WWW.CPNT.COM.AU
 PHONE: 08 9478 1000
 FAX: 08 9478 1001
 REG. NO. 4475 2R 1 3775 MK
 REG. NO. 81019 847 000
 POST: PO BOX 1004 TOWNVILLE 4810
 OFFICE: 41 INGHAM RD TOWNVILLE 4810

PROJECT: TOWNVILLE MARINE TOURISM PRECINCT

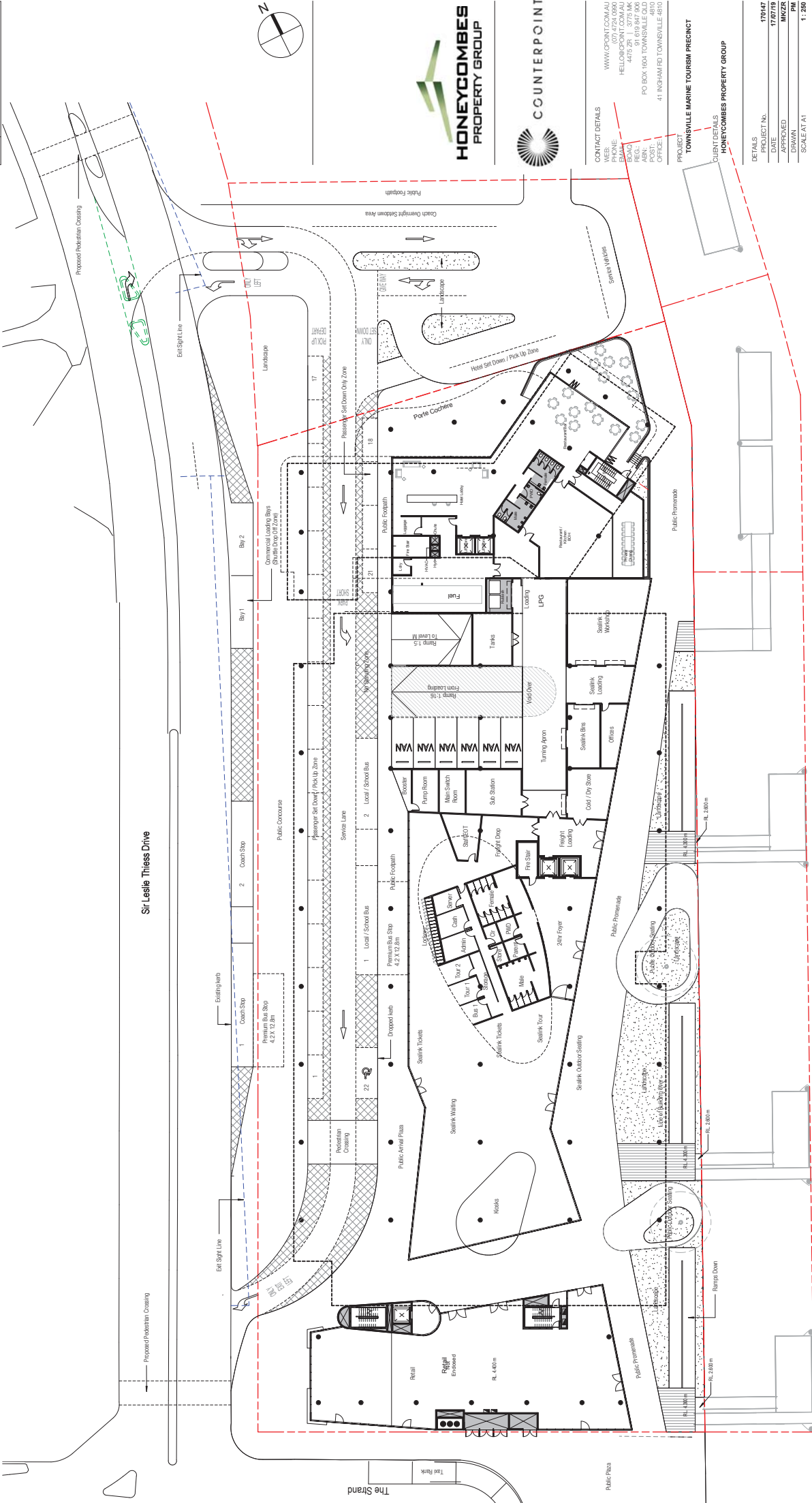
CLIENT DETAILS
 HONEYCOMBES PROPERTY GROUP

DETAILS	17047
PROJECT No.	170719
DATE	170719
APPROVED	HKZ2R
DRAWN	PM
SCALE AT A1	1:250

REVISION
 B 03/05/19 ADDED DIMENSIONS AND LEVELS
 C 12/07/19 DEVELOPMENT APPLICATION - FURTHER ISSUES
 D 17/07/19 CONSULTANT ISSUE

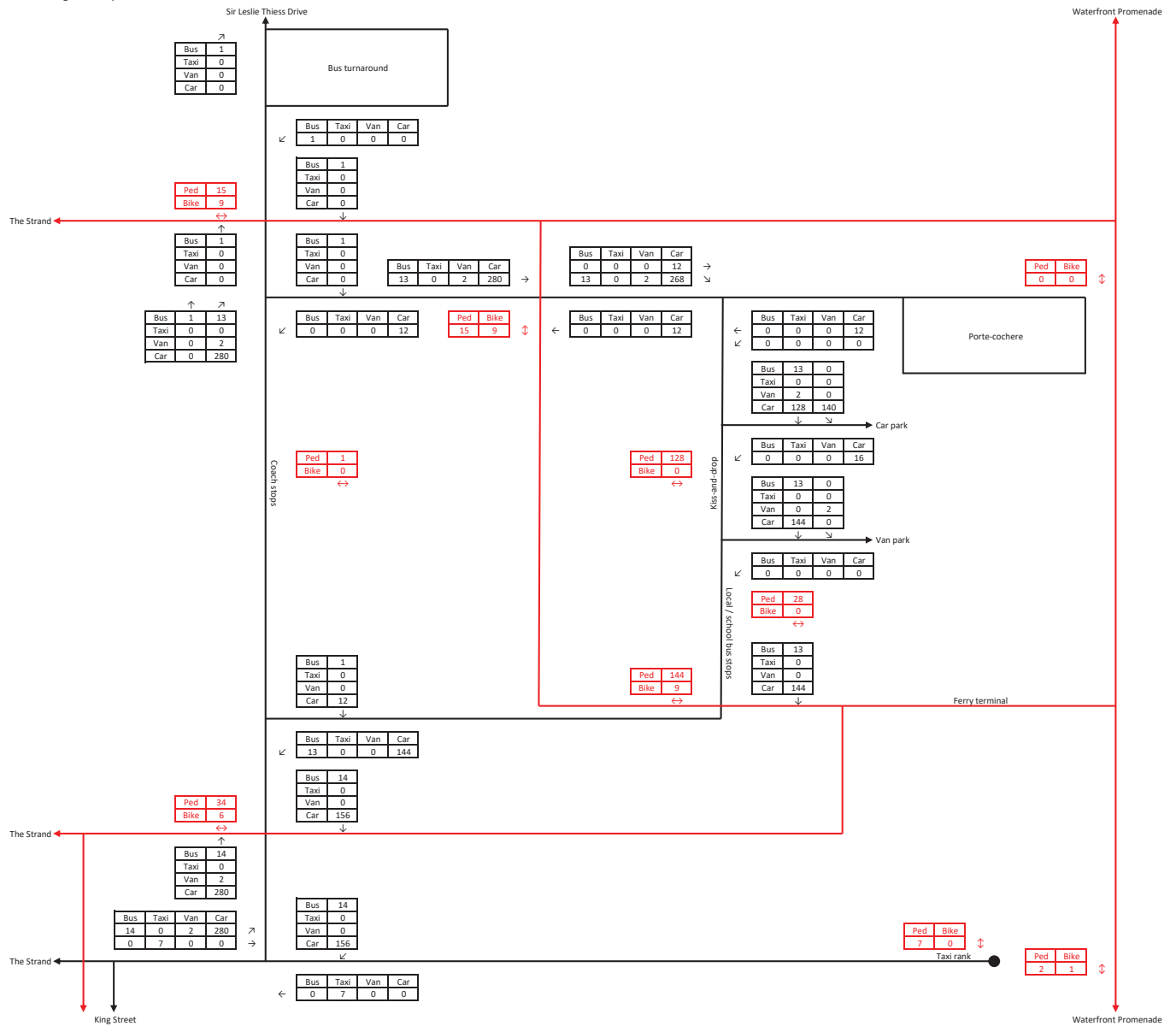
TITLE
 GROUND LEVEL

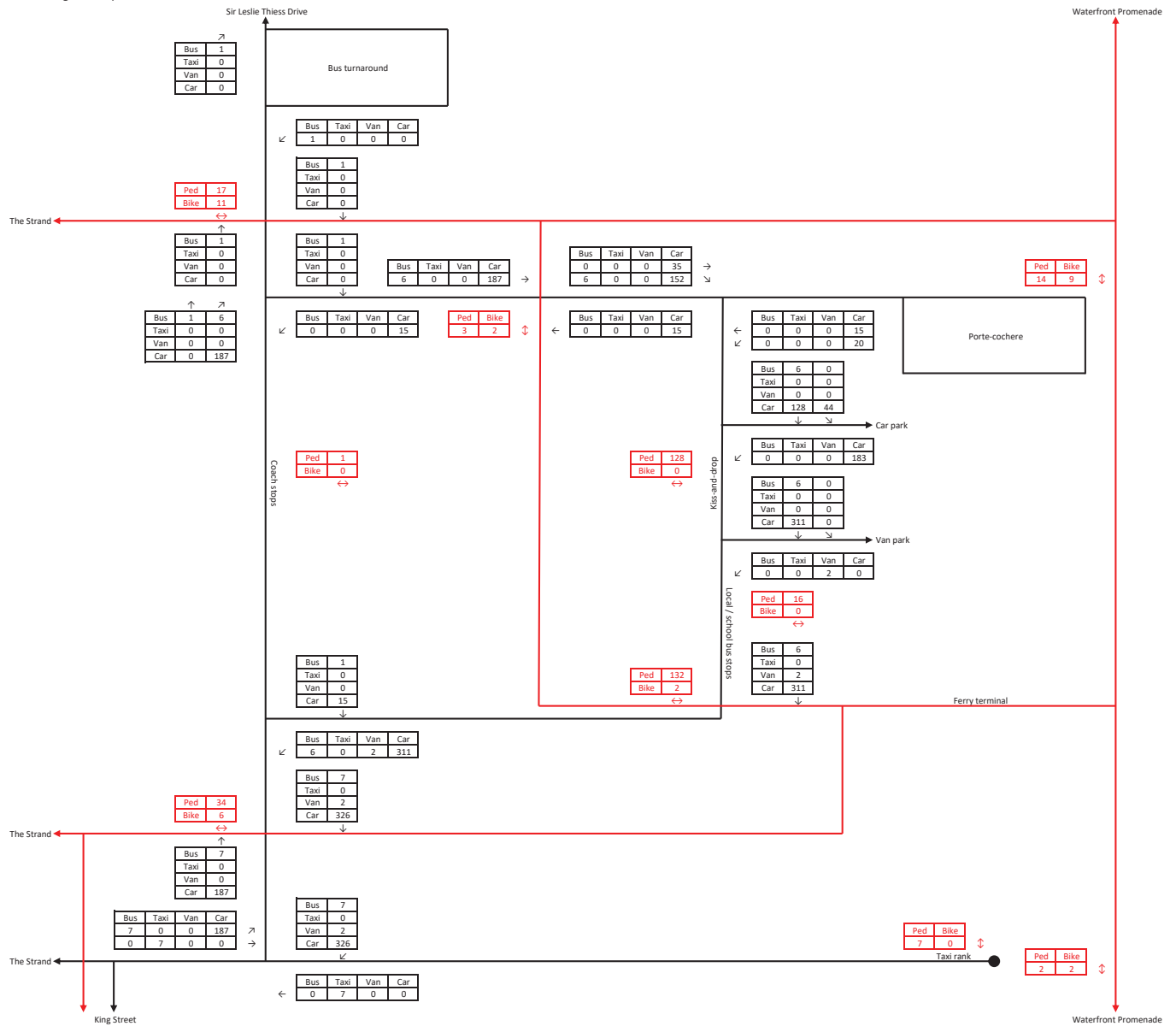
DRAWING No. DA200
 ISSUE D
 DEVELOPMENT APPLICATION



1 DA - GROUND LEVEL PLAN
 SCALE 1:250

APPENDIX D
DEVELOPMENT TRAFFIC VOLUMES ON THE NETWORK
(INCLUDING PEDESTRIANS AND BICYCLES)





APPENDIX E
TOWNSVILLE AIMSUN INTEGRATED MODEL (TAIM)
DECEMBER 2018 PEAK HOUR FORECASTS

Michael Kaye

From: Michael Kaye
Sent: Friday, 5 July 2019 9:48 AM
To: Neil Davies; Anne Edmonds; Rachael Grimes
Subject: RE: TAIM- Screenshots - Wharf area

Hi all

Further to my email this morning, Council would accept the following traffic flows on Sir Leslie Thiess Drive in lieu of the Applicant obtaining new traffic counts.

The assessment and design of the accesses into the site including the intersection requirements to allow for bus manoeuvres should use these traffic flows.

December 2018 – TAIM calibrated traffic flows on Sir Leslie Drive opposite ferry terminal site

Time Period	Northbound Flow	Southbound Flow
AM Peak (8.00am – 9.00am)	197	218
PM Peak (4.00pm – 5.00pm)	203	239
AADT	3532	3772

Note Premise have proposed the following traffic flows:

Time Period	Northbound Flow	Southbound Flow
AM Peak	135	115
PM Peak	115	135

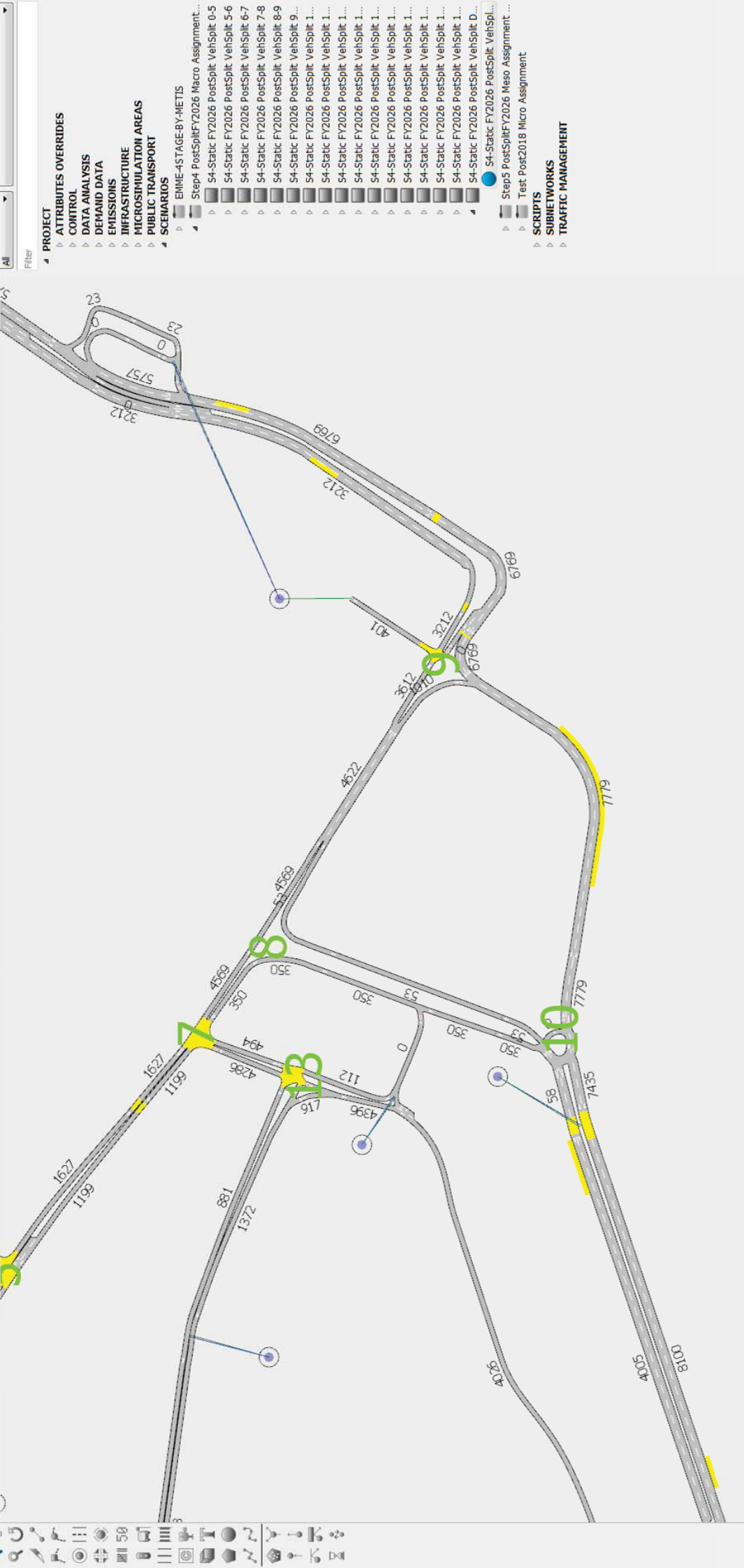
Council's figures are based on a model calibrated against 148 live traffic counts taken at traffic signals across the city over a two week period in early December 2018.

Premises figures based on assumptions taken from a 2007 traffic report for a development across the road.

Cheers

Michael Kaye RPEQ, MIEAust, CPEng, APEC Engineer, IntPE(Aus)
Traffic & Infrastructure Planning Engineer – Infrastructure Planning
Planning, Environment and Cultural Services

APPENDIX F
TOWNSVILLE AIMSUN INTEGRATED MODEL (TAIM)
FUTURE AADT FORECASTS





APPENDIX G
SIR LESLIE THIESS DRIVE NORTHERN CROSSING APCFST
ASSESSMENT



Australasian Pedestrian Crossing Facility Selection Tool [V2.1.3]

?

HELP

PRINT

Choose FileNo file chosen

Load a CSV File

OR fill in the form below

✔File loaded

Townsville Marine Tourism Precinct_3_11-07-2019.csv was loaded successfully.

Project details

Project name:

Townsville Marine Tourism Precinct

Project location:

Sir Leslie Thieess Drive north

Option/assessment number:

3.1

Date of assessment:

16-07-2019

Site information

Jurisdiction:

Queensland

Midblock or intersection?

Intersection

Existing facility:

Median refuge

Crash information

Use crash model or crash history?

History

Years of crash history:

17

Number of pedestrian injury crashes:

0

Wombat crossings

The tool can be used to assess Wombat crossings. A Wombat crossing is functionally similar to a "Zebra with platform" or "Zebra with platform and kerb extensions" (if the crossing includes kerb extensions). To assess a Wombat crossing please select the appropriate crossing type in the Feasible facilities table and continue with the assessment as normal.

Physical/environmental/Operational variables

Number of traffic directions:

Two

Centre treatment:

Painted median

Median width:

2metres

Median acts as refuge:

Yes

Parking/shoulder:

No

Pedestrian visibility:

115metres

Posted speed limit:

50 km/h

Direction 1

Flow:

Left to Right

Flow type:

Uninterrupted

Peak vehicle volume:

204veh/hr

Traffic lanes:

2

Crossing distance:

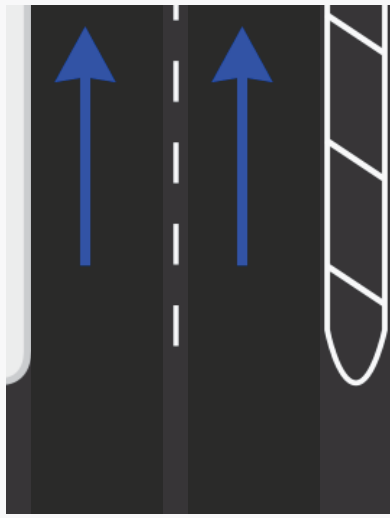
7metres

Direction 2

Flow:

Right to Left

Layout diagram



austpedtool.com/index.html

1/6

Approach speed (85th percentile):
60 km/h

Traffic volume (AADT):
7323 veh/day

Peak sensitive pedestrian volume:
0 ped/hr

Peak non-sensitive pedestrian volume:
28 ped/hr

Estimated daily pedestrian volume:
148 ped/day

Average vehicle occupancy:
1.3 pers/veh

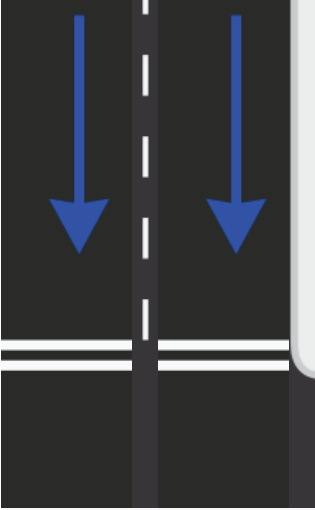
Degree of pedestrian/turning vehicle conflict:
Low

Flow type:
Uninterrupted

Peak vehicle volume:
240 veh/hr

Traffic lanes:
2

Crossing distance:
7 metres



Site characteristics

Exposed crossing distance:
7 + 7 = 14 metres

Est. pedestrian crossing time (exposed):
5.8 + 5.8 = 11.6 seconds

Total peak hourly vehicle flow:
204 + 240 = 444 veh/hr

Model parameters

Show/Hide

Walk speed of average sensitive pedestrians:
1 m/s

Walk speed of average non-sensitive pedestrians:
1.2 m/s

Average cost of pedestrian crashes:
\$ 23015

Value of delay:
\$ 29.77 /hr

Pedestrian conversion factor:
0.6

Vehicle conversion factor:
0.4

Economic assessment parameters

Evaluation days per annum:
250

Project lifetime:
30 years

Discount rate:
7 %

Economic update factors

Base date
June 2010

Update factor to current date
1

Travel time costs/savings
June 2010

Vehicle operating costs/savings
June 2010

Crash costs/savings
June 2010

1

1

1

Expected crash reduction factors

Platform	Kerb extensions	Median refuge	Kerb extensions with median refuge	Zebra only	Zebra with platform	Zebra with kerb extensions	Zebra with platform and kerb extensions	Zebra with median refuge	Zebra with kerb extensions and median refuge	Signals	Signals with kerb extensions	Grade separation
47 %	35 %	56 %	56 %	0 %	63 %	35 %	63 %	56 %	56 %	45 %	45 %	86 %

Calculate feasibility

[View the facility feasibility process \(PDF\) here](#)

☐ Automatically calculate when inputs are updated? 

Feasible facilities

	Suitable for site?	Built parameters	Construction cost	Annual maintenance cost	Show in final output? Select all/none/feasible
No facility	N/a	No parameters	\$ 0	\$ 0	☒
Platform	 No Too many lanes Not appropriate without formal median refuge	Vehicle negotiation speed: Please select ▼	\$	\$	☐
Kerb extensions	 No Not appropriate without formal median refuge	Total crossing distance: metres 	\$	\$	☐
Median refuge 	 Yes	Direction 1 crossing distance: 7 metres  Median refuge width: 2 metres  Direction 2 crossing distance: 7 metres 	\$	\$ 0	☒
Kerb extensions with median refuge	 Yes	Direction 1 crossing distance: 3.5 metres  Median refuge width: 5 metres  Direction 2 crossing distance: 7 metres 	\$	\$ 0	☒
Zebra only	 No Intersection location Too many lanes Not appropriate without formal median refuge	No parameters	\$	\$	☐

Zebra with platform ?	✖ No Zebra not suitable Platform not suitable	Applies vehicle negotiation speed from Platform above	\$	\$	☐
Zebra with kerb extensions	✖ No Zebra not suitable Kerb extensions not suitable	Applies total crossing distance from Kerb extensions above	\$	\$	☐
Zebra with platform and kerb extensions ?	✖ No Zebra not suitable Platform not suitable Kerb extensions not suitable	Applies vehicle negotiation speed from Platform and total crossing distance from Kerb extensions above	\$	\$	☐
Zebra with median refuge	✖ No Zebra not suitable	Applies distances and refuge width from Median refuge above	\$	\$	☐
Zebra with kerb extensions and median refuge	✖ No Zebra not suitable	Applies distances and refuge width from Kerb extensions with median refuge above	\$	\$	☐
Signals	✔ Yes	Cycle time: 100 seconds Percent of time in green pedestrian phase: 25 %	\$ 0	\$ 0	☒
Signals with kerb extensions	✔ Yes	Applies parameters from Signals above, plus: Direction 1 crossing distance: 3.5 metres ? Median width: 5 metres ? Direction 2 crossing distance: 7 metres ?	\$ 0	\$ 0	☒
Grade separation	✖ No Intersection location	No parameters	\$	\$	☐

Calculate assessment

Facility assessment

Suitable for site?	Pedestrian delay	Vehicle delay ?	Predicted crash rate ?	CSD ?	ASD ?	SISD ?

Median refuge *	Yes	3 sec	0 sec	0.00 /year	117 m	64 m	114 m
No facility	N/a	3 sec	0 sec	0.00 /year	117 m	64 m	114 m
Kerb extensions with median refuge	Yes	2 sec	0 sec	0.00 /year	117 m	64 m	114 m
Signals	Yes	28 sec	0 sec	0.00 /year	117 m	64 m	114 m
Signals with kerb extensions	Yes	28 sec	0 sec	0.00 /year	117 m	64 m	114 m

	Perceived delay ?	Perceived safety ?	Pedestrian LOS ?	Pedestrian delay cost ?	Pedestrian delay saving ?	Vehicle delay cost ?	Vehicle delay saving ?	Crash cost ?	Safety saving ?	Total benefits ?	BCR ?
Median refuge *	B	C	C	\$ 7,000		\$ 0		\$ 0			
No facility	B	D	D	\$ 7,000	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	Zero construction cost
Kerb extensions with median refuge	B	B	B	\$ 5,000	\$ 2,000	\$ 0	\$ 0	\$ 0	\$ 0	\$ 2,000	Zero construction cost
Signals	C	B	B	\$ 66,000	-\$ 59,000	\$ 0	\$ 0	\$ 0	\$ 0	-\$ 59,000	Zero construction cost
Signals with kerb extensions	C	B	B	\$ 66,000	-\$ 59,000	\$ 0	\$ 0	\$ 0	\$ 0	-\$ 59,000	Zero construction cost

Notes

The best option is retention of a median refuge with narrowing of northbound carriageway to a single lane.

✔

File saved

Townsville Marine Tourism Precinct_3.1_16-07-2019.csv has been saved to your default download directory.

 **Reset all Fields**

Townsville Marine Tourism Precinct_3.1_16-07_16-07 .csv

 **Export CSV File**

 **Back to top**

Disclaimer

The Australasian Pedestrian Crossing Facility Selection Web Tool ("the tool") is freely provided by [Austroads](#) and is intended to help practitioners select an appropriate pedestrian crossing facility for a particular location. The tool is based on literature, and analytical and behavioural research coupled with a number of mathematical models. Its development is detailed in the Austroads report [Development of the Pedestrian Facility Selection Tool \(PDF\)](#).

As with all mathematical models care must be taken to understand input limitations and background assumptions when interpreting the outputs. The tool does not replace professional engineering or planning advice and Austroads does not accept any responsibility regarding the tool. While we have endeavoured to ensure the information output by the tool is appropriate, we make no representations or warranties of any kind about the completeness, accuracy, reliability, suitability or availability with respect to the outputs. Any reliance you place on such information is strictly at your own risk and it is your responsibility to check all information output by the tool.

The tool should not be used to inform decision making in isolation when considering the form and location of pedestrian crossing facilities. Engineering judgement is required to consider the economic and other outputs produced by the tool alongside safety, mobility, social and environmental factors that are considered appropriate by the practitioner.

Version: [2.1.3](#)

APPENDIX H
SIR LESLIE THIESS DRIVE SOUTHERN CROSSING APCFST
ASSESSMENT



Choose File

No file chosen

Load a CSV File

OR fill in the form below

File loaded

Townsville Marine Tourism Precinct_2_10-07-2019.csv was loaded successfully.

Project details

Project name:

Townsville Marine Tourism Precinct

Project location:

Sir Leslie Thiess Drive south

Option/assessment number:

2

Date of assessment:

10/07/2019

Site information

Jurisdiction:

Queensland

Midblock or intersection?

Intersection

Existing facility

No facility

Crash information

Use crash model or crash history?

Model

Wombat crossings

The tool can be used to assess Wombat crossings. A Wombat crossing is functionally similar to a "Zebra with platform" or "Zebra with platform and kerb extensions". To assess a Wombat crossing please select the appropriate crossing type in the Feasible facilities table and continue with the assessment as normal.

Physical/environmental/Operational variables

Number of traffic directions:

Two

Centre treatment:

Raised median

Median width:

1 metres

Median acts as refuge:

No

Parking/shoulder:

No

Pedestrian visibility:

115 metres

Posted speed limit:

50 km/h

Approach speed (85th)

Direction 1

Flow:

Left to Right

Flow type:

Uninterrupted

Peak vehicle volume:

493 veh/hr

Traffic lanes:

1

Crossing distance:

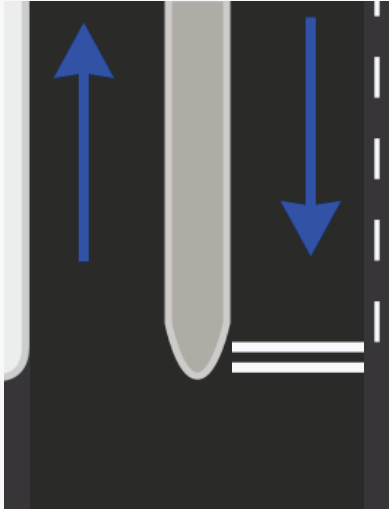
7 metres

Direction 2

Flow:

Right to Left

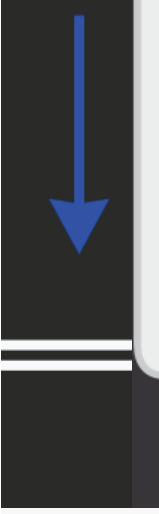
Layout diagram



austpedtool.com/index.html#

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percentile):	60 km/h	Flow type:	Uninterrupted
Traffic volume (AADT):	12279 veh/day	Peak vehicle volume:	574 veh/hr
Peak sensitive pedestrian volume:	0 ped/hr	Traffic lanes:	2
Peak non-sensitive pedestrian volume:	40 ped/hr	Crossing distance:	7 metres
Estimated daily pedestrian volume:	400 ped/day		
Average vehicle occupancy:	1.3 pers/veh		
Degree of pedestrian/turning vehicle conflict:	High		



Site characteristics

Exposed crossing distance: **7 + 1 + 7 = 15 metres**

Est. pedestrian crossing time (exposed): **12.5 seconds**

Total peak hourly vehicle flow: **493 + 574 = 1,067 veh/hr**

Model parameters Show/Hide		Economic assessment parameters		Economic update factors	
Walk speed of average sensitive pedestrians:	1 m/s	Evaluation days per annum:	250	Base date	June 2010
Walk speed of average non-sensitive pedestrians:	1.2 m/s	Project lifetime:	30 years	Travel time costs/savings	1
Average cost of pedestrian crashes:	\$ 23015k	Discount rate:	7 %	Vehicle operating costs/savings	1
Value of delay:	\$ 29,77 /hr			Crash costs/savings	1
Pedestrian conversion factor:	0.6				
Vehicle conversion factor:	0.4				

Expected crash reduction factors												
Platform	Kerb extensions	Median refuge	Kerb extensions with median refuge	Zebra only	Zebra with platform	Zebra with kerb extensions	Zebra with platform and kerb extensions	Zebra with median refuge	Zebra with kerb extensions and median refuge	Signals	Signals with kerb extensions	Grade separation
47 %	35 %	56 %	56 %	0 %	63 %	35 %	63 %	56 %	56 %	45 %	45 %	86 %

[Calculate feasibility](#)
[View the facility feasibility process \(PDF\) here](#)

☐ Automatically calculate when inputs are updated? [?](#)

Feasible facilities

	Suitable for site?	Built parameters	Construction cost	Annual maintenance cost	Show in final output? Select all/none/feasible
No facility	N/a	No parameters	\$	\$ 0	☒
Platform	No Too many lanes Not appropriate without formal median refuge	Vehicle negotiation speed: Please select	\$	\$	☐
Kerb extensions	No Not appropriate without formal median refuge	Total crossing distance: metres	\$	\$	☐
Median refuge	Yes	Direction 1 crossing distance: 6 metres Median refuge width: 2 metres Direction 2 crossing distance: 7 metres	\$ 0	\$ 0	☒
Kerb extensions with median refuge	Yes	Direction 1 crossing distance: 3.5 metres Median refuge width: 2 metres Direction 2 crossing distance: 7 metres	\$ 0	\$ 0	☒
Zebra only	No Intersection location Too many lanes Not appropriate without formal median refuge	No parameters	\$	\$	☐
Zebra with platform ?	No Zebra not suitable Platform not suitable	Applies vehicle negotiation speed from Platform above	\$	\$	☐

Zebra with kerb extensions	No Zebra not suitable Kerb extensions not suitable	Applies total crossing distance from Kerb extensions above	\$	\$	☐
Zebra with platform and kerb extensions	No Zebra not suitable Platform not suitable Kerb extensions not suitable	Applies vehicle negotiation speed from Platform and total crossing distance from Kerb extensions above	\$	\$	☐
Zebra with median refuge	No Zebra not suitable	Applies distances and refuge width from Median refuge above	\$	\$	☐
Zebra with kerb extensions and median refuge	No Zebra not suitable	Applies distances and refuge width from Kerb extensions with median refuge above	\$	\$	☐
Signals	Yes	Cycle time: 100 seconds Percent of time in green pedestrian phase: 25 %	\$ 0	0	☒
Signals with kerb extensions	Yes	Applies parameters from Signals above, plus: Direction 1 crossing distance: 3.5 metres Median width: 2 metres Direction 2 crossing distance: 7 metres	\$ 0	0	☒
Grade separation	No Intersection location	No parameters	\$	\$	☐

[Calculate assessment](#)

Facility assessment

	Suitable for site?	Pedestrian delay	Vehicle delay	Predicted crash rate	CSD	ASD	SISD
No facility	N/a		0 sec	0.05 /year	250 m	64 m	114 m
Median refuge	Yes	9 sec	0 sec	0.02 /year	117 m	64 m	114 m
Kerb extensions with median refuge	Yes	6 sec	0 sec	0.02 /year	117 m	64 m	114 m

Signals	Yes	28 sec	0 sec	0.03 /year	250 m	64 m	114 m				
Signals with kerb extensions	Yes	28 sec	0 sec	0.03 /year	117 m	64 m	114 m				
	Perceived delay ?	Perceived safety ?	Pedestrian LOS ?	Pedestrian delay cost ?	Pedestrian delay saving ?	Vehicle delay cost ?	Vehicle delay saving ?	Crash cost ?	Safety saving ?	Total benefits ?	BCR ?
No facility *	F	F	F	\$ 1,344,000		\$ 0		\$ 151,000			
Median refuge	B	D	D	\$ 56,000	\$ 1,289,000	\$ 0	\$ 0	\$ 67,000	\$ 85,000	\$ 1,373,000	Zero construction cost
Kerb extensions with median refuge	B	C	C	\$ 41,000	\$ 1,303,000	\$ 0	\$ 0	\$ 67,000	\$ 85,000	\$ 1,388,000	Zero construction cost
Signals	C	B	B	\$ 179,000	\$ 1,165,000	\$ 0	\$ 0	\$ 83,000	\$ 68,000	\$ 1,233,000	Zero construction cost
Signals with kerb extensions	C	B	B	\$ 179,000	\$ 1,165,000	\$ 0	\$ 0	\$ 83,000	\$ 68,000	\$ 1,233,000	Zero construction cost

Notes

A median refuge (without kerb extensions) will have the lowest construction costs and is therefore expected to result in the greatest BCR

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📄 Export CSV File

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Disclaimer

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Version: [2.1.2](#)

APPENDIX I
SERVICE LANE CROSSING APCFST ASSESSMENT



Choose File

No file chosen

Load a CSV File

OR fill in the form below

HELP

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File loaded

Townsville Marine Tourism Precinct_1_16-07-2019.csv was loaded successfully.

Project details

Project name:

Townsville Marine Tourism Precinct

Project location:

service lane

Option/assessment number:

1.1

Date of assessment:

16/07/2019

Site information

Jurisdiction:

Queensland

Midblock or intersection?

Midblock

Existing facility

Kerb extensions

Crash information

Use crash model or crash history?

Model

Wombat crossings

The tool can be used to assess Wombat crossings. A Wombat crossing is functionally similar to a "Zebra with platform" or "Zebra with platform and kerb extensions" (if the crossing includes kerb extensions). To assess a Wombat crossing please select the appropriate crossing type in the Feasible facilities table and continue with the assessment as normal.

Physical/environmental/Operational variables

Number of traffic directions:

One

Parking/shoulder:

Yes

Pedestrian visibility:

30 metres

Posted speed limit:

30 km/h

Approach speed (85th percentile):

30 km/h

Traffic volume (AADT):

2380 veh/day

Peak sensitive pedestrian volume:

0 ped/hr

Direction 1

Flow:

Left to Right

Flow type:

Uninterrupted

Peak vehicle volume:

319 veh/hr

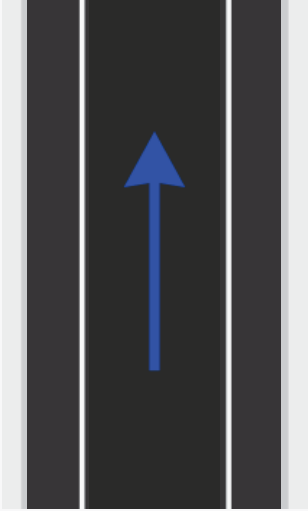
Traffic lanes:

1

Crossing distance:

3.5 metres

Layout diagram



Site characteristics

austpedtool.com/index.html#

1/6

Peak non-sensitive pedestrian volume:	153 ped/hr	Exposed crossing distance:	3.5 metres
Estimated daily pedestrian volume:	1435 ped/day	Est. pedestrian crossing time (exposed):	2.9 seconds
Average vehicle occupancy:	1.3 pers/veh	Total peak hourly vehicle flow:	319 veh/hr

Model parameters

Show/Hide

Walk speed of average sensitive pedestrians:

1 m/s

Walk speed of average non-sensitive pedestrians:

1.2 m/s

Average cost of pedestrian crashes:

\$ 230156

Value of delay:

\$ 29.77 /hr

Pedestrian conversion factor:

0.6

Vehicle conversion factor:

0.4

Economic assessment parameters

Evaluation days per annum:

250

Project lifetime:

30 years

Discount rate:

7 %

Economic update factors

Base date

June 2010

Update factor t current date

1

Travel time costs/savings

June 2010

1

Vehicle operating costs/savings

June 2010

1

Crash costs/savings

June 2010

1

Expected crash reduction factors

Platform	Kerb extensions	Median refuge	Kerb extensions with median refuge	Zebra only	Zebra with platform	Zebra with kerb extensions	Zebra with platform and kerb extensions	Zebra with median refuge	Zebra with kerb extensions and median refuge	Signals	Signals with kerb extensions	Grade separation
47 %	35 %	56 %	56 %	0 %	63 %	35 %	63 %	56 %	56 %	45 %	45 %	86 %

Calculate feasibility

[View the facility feasibility process \(PDF\) here](#)

☐ Automatically calculate when inputs are updated?

Feasible facilities

Suitable for site?	Built parameters	Construction cost	Annual maintenance cost	Show in final output? Select all/none/feasible
--------------------	------------------	-------------------	-------------------------	---

No facility	N/a	No parameters	\$ 0	\$ 0	☒
Platform	✔ Yes	Vehicle negotiation speed: 20 km/h ▼	\$ 0	\$ 0	☒
Kerb extensions ✱	✔ Yes	Total crossing distance: 3.5 metres ⓘ	\$	\$ 0	☒
Median refuge	✖ No Only one trafficked lane	Direction 1 crossing distance: metres ⓘ Median refuge width: metres ⓘ Direction 2 crossing distance: metres ⓘ	\$		☐
Kerb extensions with median refuge	✖ No Median refuge not suitable	Direction 1 crossing distance: metres ⓘ Median refuge width: metres ⓘ Direction 2 crossing distance: metres ⓘ	\$		☐
Zebra only	⚠ May require approval Road is one-lane one-way	No parameters	\$ 0	\$ 0	☒
Zebra with platform ⓘ	⚠ May require approval Zebra may not be suitable	Applies vehicle negotiation speed from Platform above	\$ 0	\$ 0	☒
Zebra with kerb extensions	⚠ May require approval Zebra may not be suitable	Applies total crossing distance from Kerb extensions above	\$ 0	\$ 0	☒
Zebra with platform and kerb extensions ⓘ	⚠ May require approval Zebra may not be suitable	Applies vehicle negotiation speed from Platform and total crossing distance from Kerb extensions above	\$ 0	\$ 0	☒
Zebra with median refuge	✖ No Zebra may not be suitable Median refuge not suitable	Applies distances and refuge width from Median refuge above	\$		☐
Zebra with kerb extensions and median refuge	✔ Yes	Applies distances and refuge width from Kerb extensions with median refuge above	\$ 0	\$ 0	☐

	Zebra may not be suitable Kerb extensions with median refuge not suitable				
Signals	✔ Yes	Signals activated by pedestrian call button? No ▼ Cycle time: 50 seconds Percent of time in green pedestrian phase: 40 %	\$ 0	\$ 0	✔
Signals with kerb extensions	✔ Yes	Applies parameters from Signals above, plus: Total crossing distance: 3.5 metres	\$ 0	\$ 0	✔
Grade separation	⚠ Maybe Max. of approach/posted speed < 75km/h	No parameters	\$ 0	\$ 0	✔

Calculate assessment

Facility assessment

	Suitable for site?	Pedestrian delay	Vehicle delay	Predicted crash rate	CSD	ASD	SISD
Kerb extensions *	Yes	1 sec	0 sec	0.01 /year	29 m	22 m	47 m
No facility	N/a	1 sec	0 sec	0.02 /year	29 m	22 m	47 m
Platform	Yes	1 sec	1 sec	0.01 /year	29 m	22 m	47 m
Zebra only	May require approval	7 sec	1 sec	0.02 /year	29 m	22 m	47 m
Zebra with platform	May require approval	7 sec	1 sec	0.01 /year	29 m	22 m	47 m
Zebra with kerb extensions	May require approval	7 sec	1 sec	0.01 /year	29 m	22 m	47 m
Zebra with platform and kerb extensions	May require approval	7 sec	1 sec	0.01 /year	29 m	22 m	47 m
Signals	Yes	9 sec	6 sec	0.01 /year	29 m	22 m	47 m

	Yes	Maybe	9 sec	6 sec	0.01 /year	29 m	22 m	47 m			
Signals with kerb extensions											
Grade separation			0 sec	0 sec	0.00 /year						
	Perceived delay [?]	Perceived safety [?]	Pedestrian LOS [?]	Pedestrian delay cost [?]	Pedestrian delay saving [?]	Vehicle delay cost [?]	Vehicle delay saving [?]	Crash cost [?]	Safety saving [?]	Total benefits [?]	BCR [?]
Kerb extensions [*]	A	D	C	\$ 13,000		\$ 0		\$ 43,000			
No facility	A	D	D	\$ 13,000	\$ 0	\$ 0	\$ 0	\$ 67,000	-\$ 23,000	-\$ 23,000	Zero construction cost
Platform	A	D	C	\$ 13,000	\$ 0	\$ 41,000	-\$ 41,000	\$ 35,000	\$ 8,000	-\$ 33,000	Zero construction cost
Zebra only	A	C	C	\$ 160,000	-\$ 147,000	\$ 32,000	-\$ 32,000	\$ 67,000	-\$ 23,000	-\$ 203,000	Zero construction cost
Zebra with platform	A	C	C	\$ 160,000	-\$ 147,000	\$ 73,000	-\$ 73,000	\$ 25,000	\$ 19,000	-\$ 202,000	Zero construction cost
Zebra with kerb extensions	A	C	C	\$ 160,000	-\$ 147,000	\$ 32,000	-\$ 32,000	\$ 43,000	\$ 0	-\$ 179,000	Zero construction cost
Zebra with platform and kerb extensions	A	B	B	\$ 160,000	-\$ 147,000	\$ 73,000	-\$ 73,000	\$ 25,000	\$ 19,000	-\$ 202,000	Zero construction cost
Signals	B	B	B	\$ 206,000	-\$ 193,000	\$ 189,000	-\$ 189,000	\$ 37,000	\$ 7,000	-\$ 375,000	Zero construction cost
Signals with kerb extensions	B	B	B	\$ 206,000	-\$ 193,000	\$ 189,000	-\$ 189,000	\$ 37,000	\$ 7,000	-\$ 375,000	Zero construction cost
Grade separation			A	\$ 0	\$ 13,000	\$ 0	\$ 0	\$ 9,000	\$ 34,000	\$ 47,000	Zero construction cost

Notes

The best option in terms of perceived delay, perceived safety and pedestrian LOS is a zebra with platform and kerb extensions but this is a relatively high cost option in terms of delays to

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📄 **Export CSV File**

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Version: **2.1.3**

APPENDIX J
ACCESS ROAD APCFST ASSESSMENT



Choose File

No file chosen

Load a CSV File

OR fill in the form below

File loaded

Townsville Marine Tourism Precinct_4_11-07-2019.csv was loaded successfully.

HELP

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Project details

Project name:

Townsville Marine Tourism Prec

Project location:

access road

Option/assessment number:

4.1

Date of assessment:

16-07-2019

Site information

Jurisdiction:

Queensland

Midblock or intersection?

Intersection

Existing facility

No facility

Crash information

Use crash model or crash history?

Model

Wombat crossings

The tool can be used to assess Wombat crossings. A Wombat crossing is functionally similar to a "Zebra with platform" or "Zebra with platform and kerb extensions" (if the crossing includes kerb extensions). To assess a Wombat crossing please select the appropriate crossing type in the Feasible facilities table and continue with the assessment as normal.

Physical/environmental/Operational variables

Number of traffic directions:

Two

Centre treatment:

No treatment

Parking/shoulder:

Yes

Pedestrian visibility:

50 metres

Posted speed limit:

50 km/h

Approach speed (85th percentile):

40 km/h

Traffic volume (AADT):

2575 veh/day

Direction 1

Flow:

Left to Right

Flow type:

Uninterrupted

Peak vehicle volume:

295 veh/hr

Traffic lanes:

1

Crossing distance:

6.5 metres

Direction 2

Flow:

Right to Left

Layout diagram



austpedtool.com/index.html#

1/6

Peak sensitive pedestrian volume:
0 ped/hr

Peak non-sensitive pedestrian volume:
24 ped/hr

Estimated daily pedestrian volume:
165 ped/day

Average vehicle occupancy:
1.3 pers/veh

Degree of pedestrian/turning vehicle conflict:
High

Flow type:
Uninterrupted

Peak vehicle volume:
15 veh/hr

Traffic lanes:
1

Crossing distance:
3.5 metres

Site characteristics

Exposed crossing distance:
6.5 + 3.5 = 10 metres

Est. pedestrian crossing time (exposed): 8.3 seconds

Total peak hourly vehicle flow:
295 + 15 = 310 veh/hr

Model parameters

Show/Hide

Walk speed of average sensitive pedestrians:
1 m/s

Walk speed of average non-sensitive pedestrians:
1.2 m/s

Average cost of pedestrian crashes:
\$ 23015t

Value of delay:
\$ 29.77 /hr

Pedestrian conversion factor:
0.6

Vehicle conversion factor:
0.4

Economic update factors

Economic assessment parameters

Evaluation days per annum:
250

Project lifetime:
30 years

Discount rate:
7 %

Base date:
June 2010

Update factor to current date:
1

Travel time costs/savings
June 2010

Vehicle operating costs/savings
June 2010

Crash costs/savings
June 2010

Expected crash reduction factors

Calculate feasibility

View the facility feasibility process (PDF) here

☐ Automatically calculate when inputs are updated?

Feasible facilities

	Suitable for site?	Built parameters	Construction cost	Annual maintenance cost	Show in final output? Select all/none/feasible
No facility	N/a	No parameters	\$	\$ 0	☒
Platform	Yes	Vehicle negotiation speed: 25 km/h	\$ 0	\$ 0	☒
Kerb extensions	Yes	Total crossing distance: 7 metres	\$ 0	\$ 0	☒
Median refuge	Yes	Direction 1 crossing distance: 6.5 metres Median refuge width: 2 metres Direction 2 crossing distance: 3.5 metres	\$ 0	\$ 0	☒
Kerb extensions with median refuge	Yes	Direction 1 crossing distance: 3.5 metres Median refuge width: 2 metres Direction 2 crossing distance: 3.5 metres	\$ 0	\$ 0	☒
Zebra only	No Intersection location	No parameters	\$	\$	☐
Zebra with platform	No Zebra not suitable	Applies vehicle negotiation speed from Platform above	\$	\$	☐
Zebra with kerb extensions	No Zebra not suitable	Applies total crossing distance from Kerb extensions above	\$	\$	☐
Zebra with platform and kerb extensions	No Zebra not suitable	Applies vehicle negotiation speed from Platform and total crossing distance from Kerb extensions above	\$	\$	☐

Zebra with median refuge	No Zebra not suitable	Applies distances and refuge width from <i>Median refuge</i> above			\$		\$		☐
Zebra with kerb extensions and median refuge	No Zebra not suitable	Applies distances and refuge width from <i>Kerb extensions with median refuge</i> above			\$		\$		☐
Signals	Yes	Cycle time: 100 seconds	Percent of time in green pedestrian phase: 25 %	\$	0	\$	0	\$	☒
Signals with kerb extensions	Yes	Applies parameters from <i>Signals</i> above, plus: Total crossing distance: 7 metres			\$	0	\$	0	☒
Grade separation	No Intersection location	No parameters			\$		\$		☐

[Calculate assessment](#)

Facility assessment

	Suitable for site?	Pedestrian delay	Vehicle delay	Predicted crash rate	CSD	ASD	SISD
No facility *	N/a	5 sec	0 sec	0.02 /year	111 m	34 m	67 m
Platform	Yes	5 sec	1 sec	0.01 /year	111 m	34 m	67 m
Kerb extensions	Yes	2 sec	0 sec	0.01 /year	78 m	34 m	67 m
Median refuge	Yes	2 sec	0 sec	0.01 /year	72 m	34 m	67 m
Kerb extensions with median refuge	Yes	1 sec	0 sec	0.01 /year	39 m	34 m	67 m
Signals	Yes	28 sec	0 sec	0.01 /year	111 m	34 m	67 m

Signals with kerb extensions		Yes		28 sec		0 sec		0.01 /year		78 m		34 m		67 m	
		Perceived delay ?	Perceived safety ?	Pedestrian LOS ?	Pedestrian delay cost ?	Pedestrian delay saving ?	Vehicle delay cost ?	Vehicle delay saving ?	Crash cost ?	Safety saving ?	Total benefits ?	BCR ?			
No facility *		B	F	E	\$ 13,000		\$ 0		\$ 45,000						
Platform		B	E	E	\$ 13,000	\$ 0	\$ 116,000	- \$ 116,000	\$ 24,000	\$ 21,000	- \$ 94,000	Zero construction cost			
Kerb extensions		A	E	D	\$ 6,000	\$ 7,000	\$ 0	\$ 0	\$ 29,000	\$ 16,000	\$ 23,000	Zero construction cost			
Median refuge		B	D	D	\$ 5,000	\$ 8,000	\$ 0	\$ 0	\$ 20,000	\$ 25,000	\$ 34,000	Zero construction cost			
Kerb extensions with median refuge		A	D	D	\$ 1,000	\$ 12,000	\$ 0	\$ 0	\$ 20,000	\$ 25,000	\$ 37,000	Zero construction cost			
Signals		C	B	B	\$ 74,000	- \$ 61,000	\$ 0	\$ 0	\$ 25,000	\$ 20,000	- \$ 40,000	Zero construction cost			
Signals with kerb extensions		C	B	B	\$ 74,000	- \$ 61,000	\$ 0	\$ 0	\$ 25,000	\$ 20,000	- \$ 40,000	Zero construction cost			

Notes

The best option appears to be a design with a median refuge and traffic lanes restricted to the minimum required to accommodate the swept path of the design vehicle

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Version: [2.1.3](#)

APPENDIX K
TRAFFIC IMPACT ASSESSMENT CERTIFICATION

CERTIFICATION OF TRAFFIC IMPACT ASSESSMENT REPORT
REGISTERED PROFESSIONAL ENGINEER QUEENSLAND
FOR

Project Title	Townsville Marine Tourism Precinct – Ferry Terminal Public Passenger Transport Assessment
----------------------	--

As a professional engineer registered by the Board of Professional Engineers of Queensland pursuant to the *Professional Engineers Act 2002* as competent in my areas of nominated expertise, I understand and recognise:

- The significant role of engineering as a profession; and that
- The community has a legitimate expectation that my certification affixed to this engineering work can be trusted; and that
- I am responsible for ensuring its preparation has satisfied all necessary standards, conduct and contemporary practice.

As the responsible RPEQ, I certify:

- I am satisfied that all submitted components comprising this traffic impact assessment, listed in the following table, have been completed in accordance with the Guide to Traffic Impact Assessment published by the Queensland Department of Transport and Main Roads and using sound engineering principles; and
- Where specialised areas of work have not been under my direct supervision, I have reviewed the outcomes of the work and consider the work and its outcomes as suitable for the purposes of this traffic impact assessment; and that
- The outcomes of this traffic impact assessment are a true reflection of results of assessment; and that
- I believe the strategies recommended for mitigating impacts by this traffic impact assessment, embrace contemporary practice initiatives and will deliver the desired outcomes.

Name	Bradley Jones
RPEQ No.	19986
RPEQ Competencies	Civil
Email	Bradley.Jones@premise.com.au
Postal Address	PO Box 1110 TOWNSVILLE QLD 4810
Signature	
Date	17 July 2019

Traffic impact assessment components to which this certification applies	☒
1. Introduction	
Background	☒
Scope and study area	☒
Pre-lodgement meeting notes	☐
2. Existing Conditions	
Land use and zoning	☐
Adjacent land uses / approvals	☒
Surrounding road network details	☐
Traffic volumes	☒
Intersection and network performance	☐
Road safety issues	☐
Site access	☐
Public transport (if applicable)	☐
Active transport (if applicable)	☐
Parking (if applicable)	☐
Pavement (if applicable)	☐
Transport infrastructure (if applicable)	☐
3. Proposed Development Details	
Development site plan	☒
Operational details (including year of opening each stage and any relevant catchment / market analysis)	☒
Proposed access and parking	☒
4. Development Traffic	
Traffic generation (by development stage if relevant and considering light and heavy vehicle trips)	☒
Trip distribution	☒
Development traffic volumes on the network	☒
5. Impact Assessment and Mitigation	
With and without development traffic volumes	☒
Construction traffic impact assessment and mitigation (if applicable)	☐
Road safety impact assessment and mitigation	☐
Access and frontage impact assessment and mitigation	☐
Intersection delay impact assessment and mitigation	☐
Road link capacity assessment and mitigation	☐
Pavement impact assessment and mitigation	☐
Transport infrastructure impact assessment and mitigation	☐
Other impacts assessment relevant to the specific development type / location (if applicable) - Bus stop infrastructure - Taxi infrastructure - Pedestrian crossing / refuge locations	☒
6. Conclusions and Recommendations	
Summary of impacts and mitigation measures proposed	☒
Certification statement and authorisation	☒



Premise

1300 017 736

mail@premise.com.au

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ENGINEERING



ENVIRONMENT



AGRICULTURE



WATER

ANNEXURE H
ADDENDUM TO TRAFFIC AND TRANSPORT IMPACT ASSESSMENT
(17 JULY 2019)

Our Ref: HON0031-L04-BJ

Contact: Bradley Jones

17 July 2019

The Manager
Honeycombes Property Group
281 Sturt Street
TOWNSVILLE QLD 4810

Attention: Mr Peter Honeycombe

Dear Peter

**TOWNSVILLE MARINE TOURISM PRECINCT – FERRY TERMINAL
ADDENDUM TO TRAFFIC AND TRANSPORT IMPACT ASSESSMENT**

In response to the "Further Issues" letter dated 24 June 2019 from the Minister of Economic Development Queensland (EDQ) to Honeycombes Property Group (Honeycombes) we provide the following addendum to our *Traffic and Transport Impact Assessment* (HON0031/R01revB) dated 17 April 2019.

Background

Premise produced *Traffic and Transport Impact Assessment: Townsville Marine Tourism Precinct – Ferry Terminal* (HON0031/R01revB) and *Townsville Marine Tourism Precinct – Ferry Terminal / Desk-Top External Road Network Impact Assessment* letter (HON0031-L02-JTP) both dated 17 April 2019 which were submitted with a development application for land on the northeast corner of the Strand / Sir Leslie Thiess Drive intersection.

EDQ responded to the development application with:

- "Information Request and Notification Not Required" letter dated 18 June 2019; and
- "Further Issues" letter dated 24 June 2019.

A response to the "Information Request and Notification Not Required" letter was provided by Premise as *Townsville Marine Tourism Precinct – Ferry Terminal / Response to DEV2019/1027 "MEDQ Information Request and Notification Not Required Copy"* letter (HON0031-L03-JTP) dated 25 June 2019.

A response to items 1 and 5 of the "Further Issues" letter was provided by Premise as *Public Passenger Transport Assessment: Townsville Marine Tourism Precinct – Ferry Terminal* (HON0031/R01revA) dated 17 July 2019.

Various items in the "Further Issues" letter have resulted in the development site plan being amended.



This addendum to HON0031/R01revB identifies how these amendments relate to the assumptions and conclusions of HON0031/R01revB as well as responding specifically to items 2 and 3 of the "Further Issues" letter regarding site access manoeuvres and car park entry / exit sightlines.

Proposed Development Details

The amended development site plan is enclosed as Attachment A.

The only change to proposed land use is replacement of the research & education facility by commercial tenancy. HON0031/R01revB estimated the traffic profile of the research & education facility using the same assumptions as for the commercial tenancy. Therefore, the replacement of the research & education facility by commercial tenancy does not require revision of the traffic model.

The most significant changes to the development site plan relate to access and parking.

A service lane internal to the site has been added on the Sir Leslie Thiess Drive frontage. The service lane is proposed to operate one-way from the new access road at the northern end of the site to a left-out only exit onto Sir Leslie Thiess Drive near the Strand. Left-in-left-out access to the multi-level car park will be provided via the service lane and the service lane will also serve as the local / school bus stop and kiss-and-drop facility. HON0031/R01revB assumed kiss-and-drop activities would occur external to the site with local / school buses stopping on Sir Leslie Thiess Drive and kiss-and-drop activities occurring at the eastern end of the Strand.

Other significant changes to access / parking are:

- Designation of a taxi rank at the eastern end of the Strand separate to the kiss-and-drop facility;
- Separation of access to the car park from access to service areas and van parking with both areas accessed via the service lane; and
- Provision of a buffer strip on the service lane between the traffic lane and the parking lane on the right-hand side.

A more subtle change is that where it had previously been proposed to realign the Sir Leslie Thiess Drive to the west reducing the northbound carriageway to a single lane there are now no changes proposed to kerbing on the western side of Sir Leslie Thiess Drive or the median. This provides an opportunity to create a right turn lane on the northbound carriageway of Sir Leslie Thiess Drive at the access road intersection using only pavement markings.

Development Traffic

Development traffic estimates contained in HON0031/R01revB were revised in HON0031/R02revA:

- For consistency with the amended development site plan; and
- To include pedestrians, cyclists, taxis and vans.

Revised estimates of development traffic volumes on the network contained in HON0031/R02revA are enclosed as Attachment B.

The diagrams enclosed as Attachment B shows coaches and tourist buses using a turnaround facility to the north of the development to accessing the proposed bus bay on the eastern side of Sir Leslie Thiess Drive. The arrangement shown indicates buses would turn right off and left back onto Sir Leslie Thiess Drive to complete the turnaround movement. Realistically, turnaround movements will take place at the existing turnaround facility at the northern end of Sir Leslie Thiess Drive where conflicts with other traffic will be minimised.

Impact Assessment and Mitigation

WITH AND WITHOUT DEVELOPMENT TRAFFIC VOLUMES

In HON0031/R01revB, 2019 'without development' traffic was estimated based on land use and traffic generation rates. The resultant peak hour traffic estimates for Sir Leslie Thiess Drive were 135vph northbound and 115vph southbound during the morning peak hour with flows reversed in the evening peak hour.

Premise was unable to predict with certainty the form or timing of future development in the Sir Leslie Thiess Drive catchment. Therefore, HON0031/R01revB includes flow scale analysis for the study area road network to determine the factor by which estimated traffic could be increased before any of the intersections within the study area reached their practical capacity or delays became a safety concern. The flow scale determined using SIDRA Intersection Version 8 Network (SIDRA) was 241%, that is, 'with development' traffic volumes in HON0031/R01revB could increase by a factor of more than two (2) before either the study area road network reaches its practical capacity or delays at any intersection reach an unacceptable level.

Notwithstanding the above, on 6 July 2019, Townsville City Council (TCC) supplied peak hour traffic forecasts produced by the Townsville AIMSUN Integrated Model (TAIM) for December 2018 and instructed that:

- December 2018 TAIM forecasts were to be adopted as current 'without development' traffic; and
- Design life analysis is not required for the development due to road network upgrades which would be provided by the Hive over the next 10 years.

The TAIM forecasts are enclosed as Attachment C.

Premise has some concerns about the realism of TAIM forecasts as discussed in HON0031-L03-JTP and HON0031/R02revA. Despite these concerns and even though TCC are yet to supply the TAIM calibration report or any other documentation to support the TAIM forecasts, HON0031/R02revA and this addendum adopt the TAIM forecasts as current 'without development' traffic as instructed by TCC. TAIM forecasts are considered highly conservative when compared to current traffic estimates based on either 2016 traffic counts or land use and assumed traffic generation rates.

ACCESS IMPACT ASSESSMENT AND MITIGATION

In response to item 2 Site Access Manoeuvres of the "Further Issues" letter, all development traffic will enter the development site via the proposed new access road at the northern end of the development site except for taxis using the proposed Strand rank and coaches / tourist buses using a turnaround facility to the north of the development site. Advice from SeaLink is that the development will attract approximately 3,500 coaches and tourist buses per annum. Enclosed as Attachment D is a swept path plan demonstrating that a 12.5m-long local / school bus can turn right from Sir Leslie Thiess Drive, right into the service road, manoeuvre through the local / school bus stop and exit to Sir Leslie Thiess Drive at the southern end of the service lane.

The amended development plan results in significantly higher volume of traffic turning right into the proposed new access road than was estimated in HON0031/R01revB. Even with this increase in traffic, only a channelised right turn treatment with a short turn slot (CHR(S)) would be required on Sir Leslie Thiess Drive at the access road intersection based on either 2016 traffic counts or Premise estimates of 2019 traffic. However, with TAIM forecasts of Sir Leslie Thiess Drive traffic the warranted turn treatment is a channelised right turn treatment (CHR).

Based on the TAIM forecasts, it is recommended that a 55m long right turn lane (including taper) is provided on Sir Leslie Thiess Drive for traffic entering the access road. This length is recommended to:

- Allow comfortable deceleration from the posted speed limit of 50km/h or deceleration at the maximum rate from 10km/h above the speed limit to a complete stop (40m deceleration length); and
- Provide 15m of storage to accommodate one (1) van / mobile home and one (1) car, or one (1) long distance coach.

As indicated in HON0031/R01revB, sight distance on Sir Leslie Thiess Drive complies with minimum requirements for:

- Approach sight distance (64m to the road surface from a vehicle approaching on Sir Leslie Thiess Drive) and minimum gap sight distance (83m from a vehicle waiting on the access road to a vehicle approaching on Sir Leslie Thiess Drive) at the access road intersection; and
- Approach sight distance (64m to the road surface for a vehicle approaching on Sir Leslie Thiess Drive) and safe intersection sight distance (114m from a vehicle approaching on Sir Leslie Thiess Drive to a vehicle exiting the service lane) at the service lane exit.

This is confirmed by sight lines (blue dashed lines) shown on development site plans enclosed as Attachment A.

As stated in HON0031/R01revB the above sight distance provisions comply with the requirements of the *Guide to Traffic Impact Assessment* (Transport and Main Roads, December 2018).

INTERSECTION ANALYSIS

SIDRA analysis was undertaken for the following sites:

1. Bus turnaround entry from Sir Leslie Thiess Drive;
2. Bus turn around exit to Sir Leslie Thiess Drive;
3. Sir Leslie Thiess Road / access road intersection;
4. Service lane entry from the access road;
5. Car park access on the service lane;
6. Van park access on the service lane;
7. Pedestrian crossing (zebra) on the service lane;
8. Service lane exit to Sir Leslie Thiess Drive; and
9. Strand / Sir Leslie Thiess Drive intersection.

The analysis assumed that the northbound carriageway of Sir Leslie Thiess Drive is reduced from two (2) lanes to one (1) lane between the Strand and the access road and that an exclusive right turn lane is provide on Sir Leslie Thiess Drive at the access road. It is assumed that there are no changes to Sir Leslie Thiess Drive north of the access road.

The bus turnaround has conservatively be analysed as if coaches / tourist buses must give way to southbound traffic on Sir Leslie Thiess Drive. Coaches / tourist buses using the turnaround facility at the northern end of Sir Leslie Thiess Drive will have priority over all other traffic using Sir Leslie Thiess Drive resulting in lower degrees of saturation, delays and queues than shown in Attachment D.

SIDRA outputs are enclosed as Attachment D and indicate:

- All intersections are operating well below their practical capacity, i.e. degrees of saturation are much less than 0.80;
- Delays are very short, i.e. all lanes are operating at level of service A; and
- The maximum queue length in any lane at any intersection is two (2) vehicles, i.e. 95th percentile back of queue lengths are all less than 2.0.

PEDESTRIAN CROSSING / REFUGE LOCATIONS

HON0031/R02revA recommended facilities for pedestrians crossing roads be provided on:

- Sir Leslie Thiess Drive north of the access road (northern crossing) to accommodate movements between the development site and the shared path on the Strand frontage;
- Sir Leslie Thiess Drive near the Strand (southern crossing) to accommodate movements between the development site and the CBD;
- The service lane to accommodate movements between the kiss-and-drop facility on the western side of the service lane and the ferry terminal on the eastern side; and
- The access road at Sir Leslie Thiess Drive to direct pedestrians and cyclists approaching from the shared path on the Strand frontage away from the car park and van park accesses and along the concourse to the ferry terminal, and commercial and retail tenancies.

Assessments using the Australasian Pedestrian Crossing Facility Selection Tool (APCFST) concluded that for both Sir Leslie Thiess Drive crossings and the access road crossing the most appropriate crossing facility is a median refuge. Also, carriageway widths should be reduced to the minimum required width to accommodate the swept path of the design turning vehicle with provision of one (1) northbound and two (2) southbound lanes on Sir Leslie Thiess Drive.

APCFST assessment concluded that a zebra with platform and kerb extensions is the best option for pedestrians and bicycles crossing the service lane between the kiss-and-drop facility and the ferry terminal. To further improve pedestrian safety on the service lane it is recommended a 20km/h speed limit be imposed on the service lane. As local and school buses will use the service lane, design of the platform associated with the service lane crossing should align with relevant standards and guidelines for provision of traffic calming on bus routes.

Conclusions and Recommendations

Based on the preceding discussion and analysis the following conclusions are drawn:

- The conclusion of our previous *Traffic and Transport Impact Assessment* (HON0031/R01revB) that the proposed development can be accommodated with only minor upgrades to the external road network remains valid;
- All development traffic will enter the development site via the proposed new access road at the northern end of the development site except for taxis using the proposed Strand rank and coaches / tourist buses using a turnaround facility to the north of the development site;
- Swept path analysis has been undertaken to confirm that 12.5m-long local / school buses can turn right from Sir Leslie Thiess Drive into the access road, right from the access road into the service road, manoeuvre through the local / school bus stop and exit to Sir Leslie Thiess Drive at the southern end of the service lane;
- Coaches and tourist buses (approximately 3,500 vehicles per annum) will use a turnaround facility to the north of the development site in order to enter the proposed bus bay on the eastern side of Sir Leslie Thiess Drive. Turnaround movements are expected to take place at the existing turnaround facility at the northern end of Sir Leslie Thiess Drive where conflicts with other traffic will be minimised;
- A taxi rank is proposed to be designated at the eastern end of the Strand to support the development;
- It is recommended that a single northbound lane is provided on Sir Leslie Thiess Drive from the Strand to the access road and an exclusive right turn lane with a minimum length of 55m (including taper) be provided at the access road intersection. This will require changes to pavement markings but no changes will be required to the western kerb or median on Sir Leslie Thiess Drive;
- Sight distances along Sir Leslie Thiess Drive at the proposed new access road intersection and the service lane exit comply with the requirements of the *Guide to Traffic Impact Assessment* (Transport and Main Roads, December 2018); and
- Median refuges should be provided on Sir Leslie Thiess Drive north of the access road and near the Strand, and on the access road at Sir Leslie Thiess Drive.

If you have any queries in relation to the above, please contact Mr Bradley Jones on (07) 4772 0666.

Yours faithfully



Bradley Jones RPEQ
Senior Traffic Engineer
Premise Australia Pty Ltd

Enc: Attachment A – Development Site Plan
Attachment B – Development Traffic Volumes on the Network
Attachment C – Townsville AIMSUN Integrated Model (TAIM) Forecasts
Attachment D – Swept Path Plan
Attachment E – SIDRA Outputs

Cc: Mr George Milford, Milford Planning Consultants (via email)

**ATTACHMENT A
DEVELOPMENT SITE PLAN**

Code	Description
	Legend - Hotel Room



CONTACT DETAILS
 WEB: WWW.CPNT.COM.AU
 PHONE: 08 9478 1000
 FAX: 08 9478 1001
 REG. NO. 4475 2R 1 3775 MK
 REG. NO. 81019 847 000
 POST: PO BOX 1004 TOWNVILLE 4810
 OFFICE: 41 INGHAM RD TOWNVILLE 4810

PROJECT: TOWNVILLE MARINE TOURISM PRECINCT

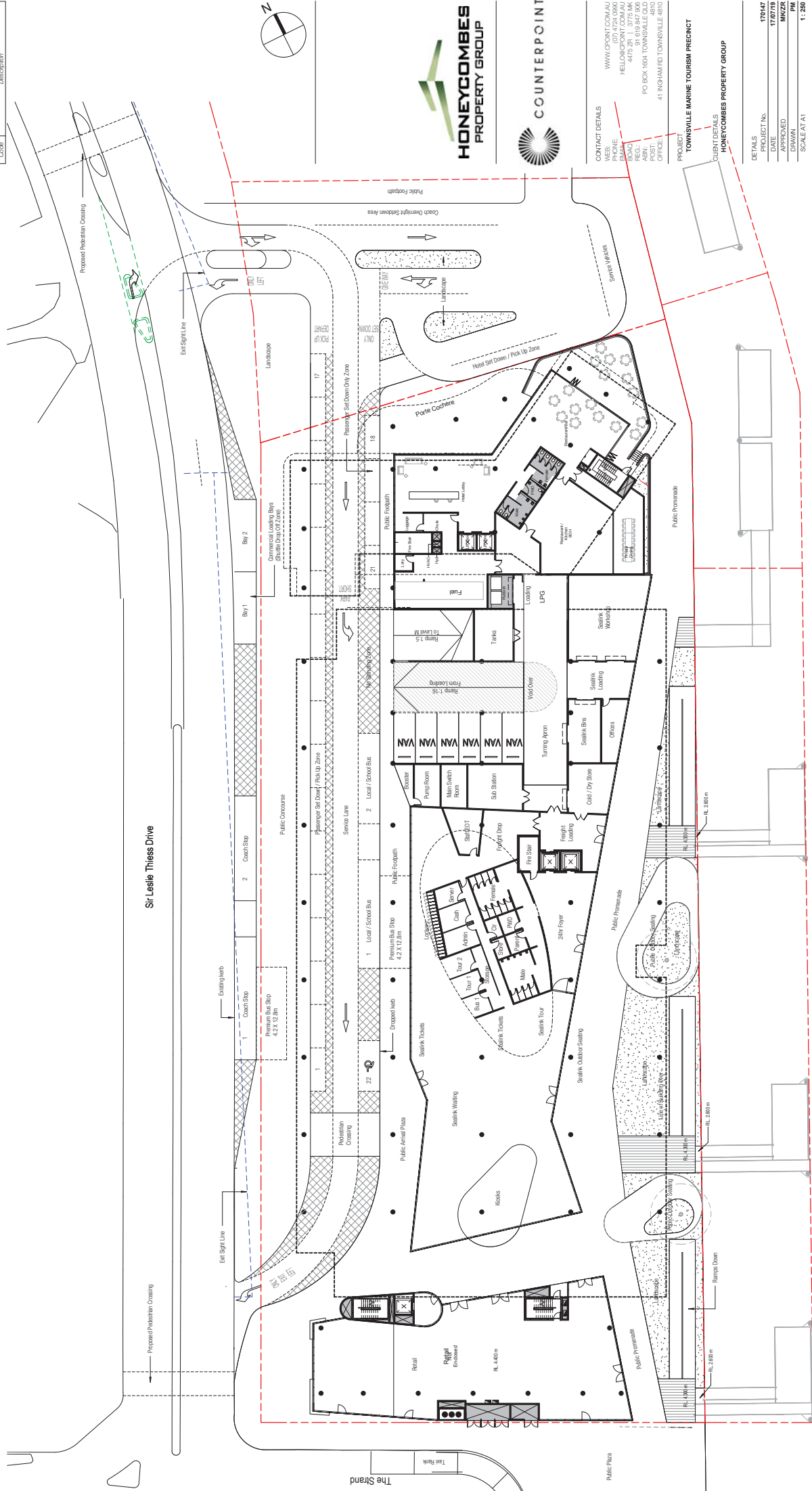
CLIENT DETAILS
 HONEYCOMBES PROPERTY GROUP

DETAILS	17047
PROJECT No.	170719
DATE	17/07/19
APPROVED	HKZ2R
DRAWN	PM
SCALE AT A1	1:250

REVISION
 B 03/05/19 ADDED DIMENSIONS AND LEVELS
 C 12/07/19 DEVELOPMENT APPLICATION - FURTHER ISSUES
 D 17/07/19 CONSULTANT ISSUE

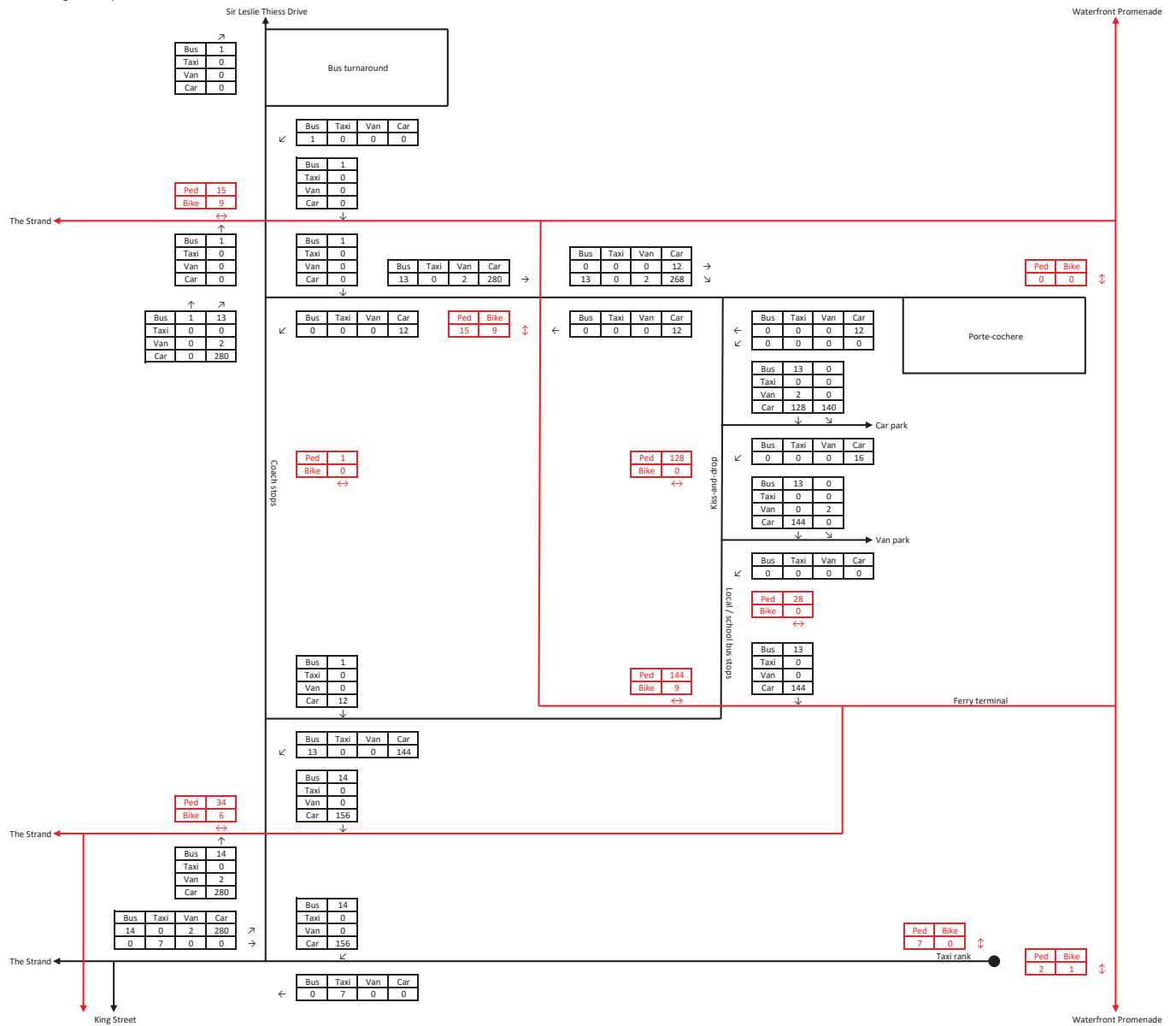
TITLE
 GROUND LEVEL

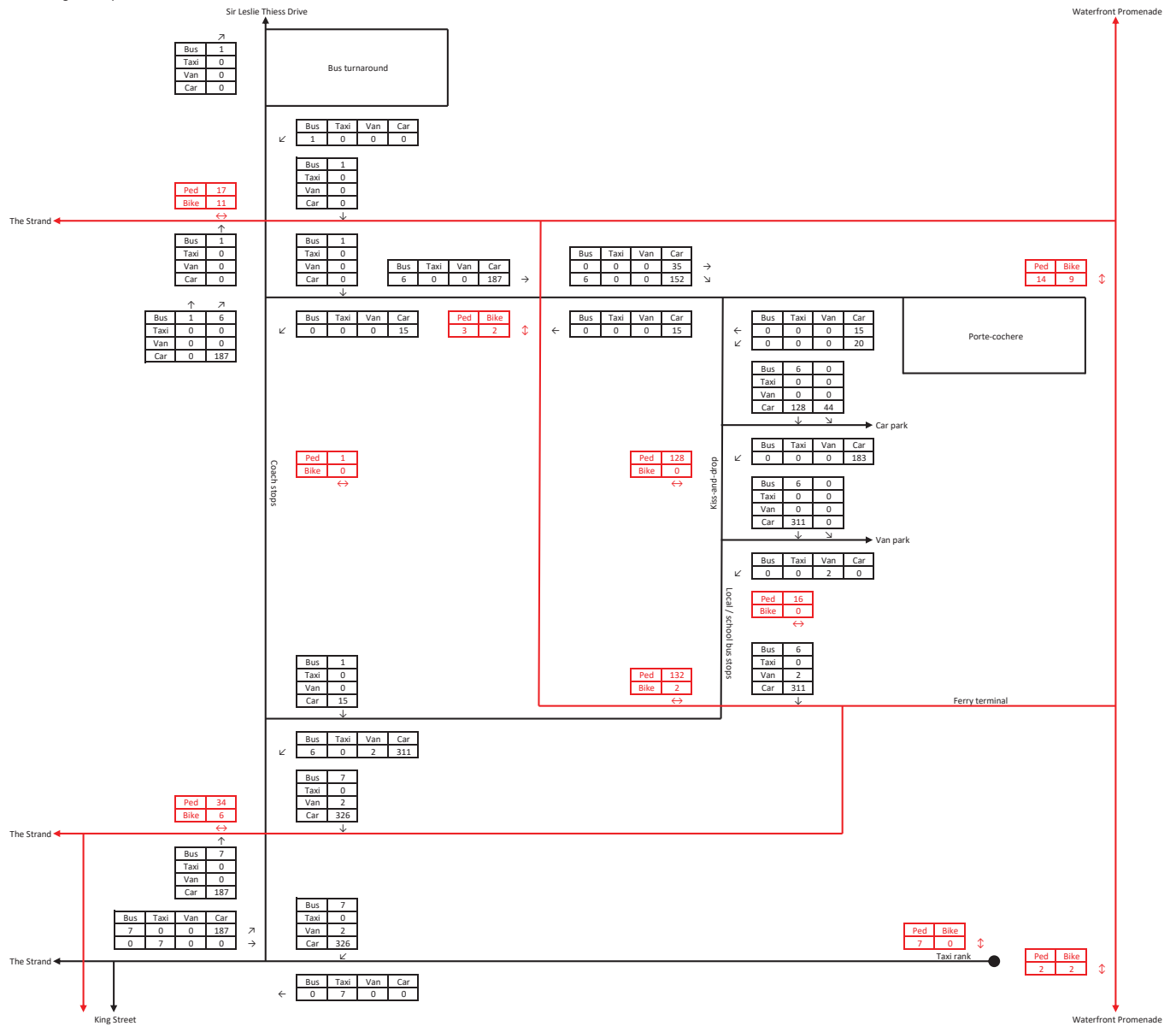
DRAWING No. **DA200** ISSUE **D**
 DEVELOPMENT APPLICATION



① DA - GROUND LEVEL PLAN
 SCALE 1:250

ATTACHMENT B
DEVELOPMENT TRAFFIC VOLUMES ON THE NETWORK





ATTACHMENT C
TOWNSVILLE AIMSUN INTEGRATED MODEL (TAIM) FORECASTS

Michael Kaye

From: Michael Kaye
Sent: Friday, 5 July 2019 9:48 AM
To: Neil Davies; Anne Edmonds; Rachael Grimes
Subject: RE: TAIM- Screenshots - Wharf area

Hi all

Further to my email this morning, Council would accept the following traffic flows on Sir Leslie Thiess Drive in lieu of the Applicant obtaining new traffic counts.

The assessment and design of the accesses into the site including the intersection requirements to allow for bus manoeuvres should use these traffic flows.

December 2018 – TAIM calibrated traffic flows on Sir Leslie Drive opposite ferry terminal site

Time Period	Northbound Flow	Southbound Flow
AM Peak (8.00am – 9.00am)	197	218
PM Peak (4.00pm – 5.00pm)	203	239
AADT	3532	3772

Note Premise have proposed the following traffic flows:

Time Period	Northbound Flow	Southbound Flow
AM Peak	135	115
PM Peak	115	135

Council's figures are based on a model calibrated against 148 live traffic counts taken at traffic signals across the city over a two week period in early December 2018.

Premises figures based on assumptions taken from a 2007 traffic report for a development across the road.

Cheers

Michael Kaye RPEQ, MIEAust, CPEng, APEC Engineer, IntPE(Aus)
Traffic & Infrastructure Planning Engineer – Infrastructure Planning
Planning, Environment and Cultural Services

ATTACHMENT D
SWEPT PATH PLAN

ATTACHMENT E
SIDRA OUTPUTS

USER REPORT FOR SITE

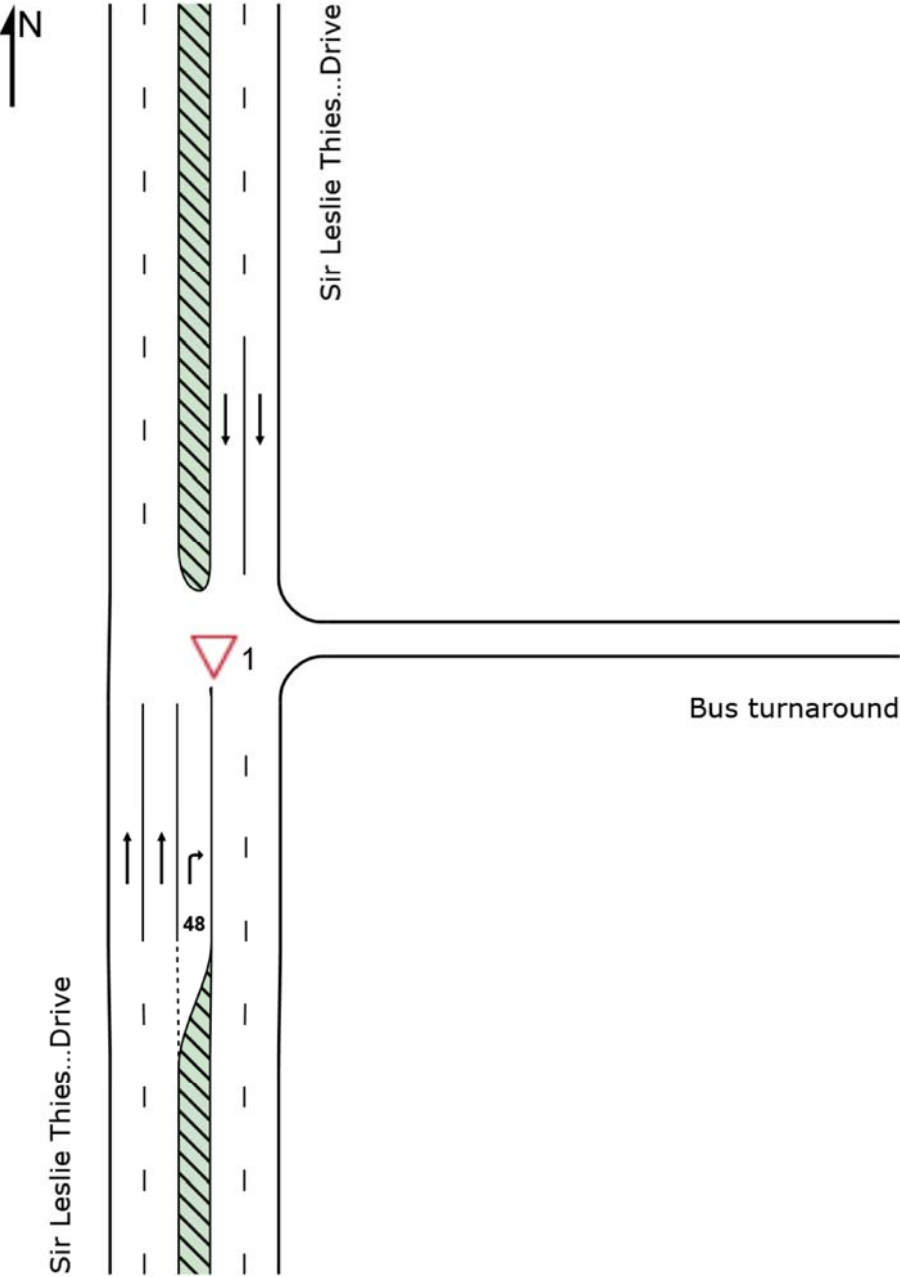
 Project: HON0031-R02-rev1-SIDRA

Template: Standard Site Report

Site: 1 [1A]

Bus turnaround entry
Morning peak hour traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Sir Leslie Thiess Drive												
2	T1	207	0.0	0.053	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	1	100.0	0.002	5.7	LOS A	0.0	0.1	0.39	0.53	0.39	30.8
Approach		208	0.5	0.053	0.0	NA	0.0	0.1	0.00	0.00	0.00	59.7
North: Sir Leslie Thiess Drive												
8	T1	229	0.0	0.059	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		229	0.0	0.059	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
All Vehicles		438	0.2	0.059	0.0	NA	0.0	0.1	0.00	0.00	0.00	59.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Sir Leslie Thiess Drive													
Lane 1	104	0.0	1950	0.053	100	0.0	LOS A	0.0	0.0	Full	50	0.0	0.0
Lane 2	104	0.0	1950	0.053	100	0.0	LOS A	0.0	0.0	Full	50	0.0	0.0
Lane 3	1	100.0	689	0.002	100	5.7	LOS A	0.0	0.1	Short	48	0.0	NA
Approach	208	0.5		0.053		0.0	NA	0.0	0.1				
North: Sir Leslie Thiess Drive													
Lane 1	115	0.0	1950	0.059	100	0.0	LOS A	0.0	0.0	Full	100	0.0	0.0
Lane 2	115	0.0	1950	0.059	100	0.0	LOS A	0.0	0.0	Full	100	0.0	0.0
Approach	229	0.0		0.059		0.0	NA	0.0	0.0				
Intersection	438	0.2		0.059		0.0	NA	0.0	0.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

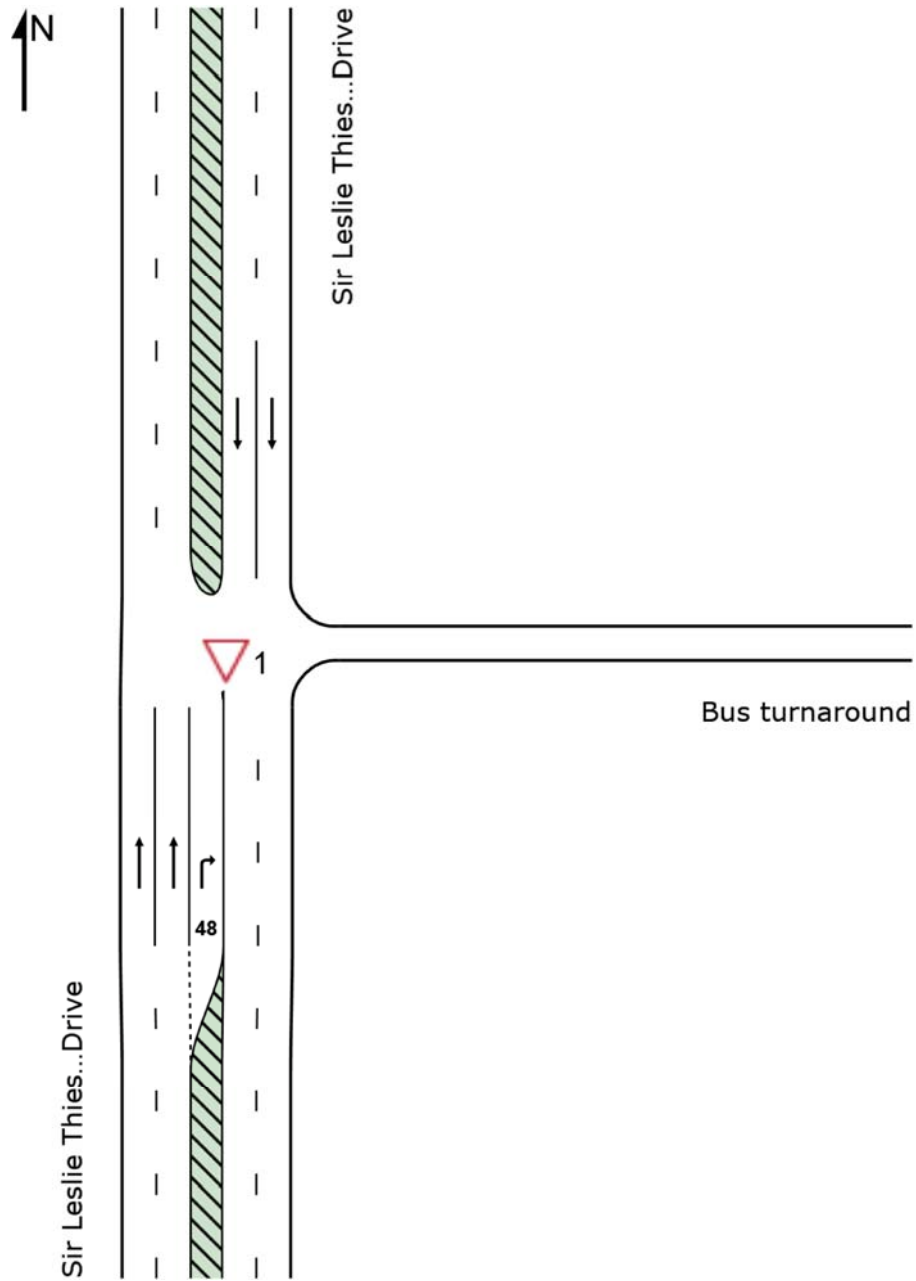
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 1 [1P]

Bus turnaround entry
Evening peak hour traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Sir Leslie Thiess Drive												
2	T1	214	0.0	0.055	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	1	100.0	0.002	5.9	LOS A	0.0	0.1	0.41	0.53	0.41	30.5
Approach		215	0.5	0.055	0.0	NA	0.0	0.1	0.00	0.00	0.00	59.7
North: Sir Leslie Thiess Drive												
8	T1	252	0.0	0.065	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		252	0.0	0.065	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
All Vehicles		466	0.2	0.065	0.0	NA	0.0	0.1	0.00	0.00	0.00	59.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Sir Leslie Thiess Drive													
Lane 1	107	0.0	1950	0.055	100	0.0	LOS A	0.0	0.0	Full	50	0.0	0.0
Lane 2	107	0.0	1950	0.055	100	0.0	LOS A	0.0	0.0	Full	50	0.0	0.0
Lane 3	1	100.0	666	0.002	100	5.9	LOS A	0.0	0.1	Short	48	0.0	NA
Approach	215	0.5		0.055		0.0	NA	0.0	0.1				
North: Sir Leslie Thiess Drive													
Lane 1	126	0.0	1950	0.065	100	0.0	LOS A	0.0	0.0	Full	100	0.0	0.0
Lane 2	126	0.0	1950	0.065	100	0.0	LOS A	0.0	0.0	Full	100	0.0	0.0
Approach	252	0.0		0.065		0.0	NA	0.0	0.0				
Intersection	466	0.2		0.065		0.0	NA	0.0	0.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

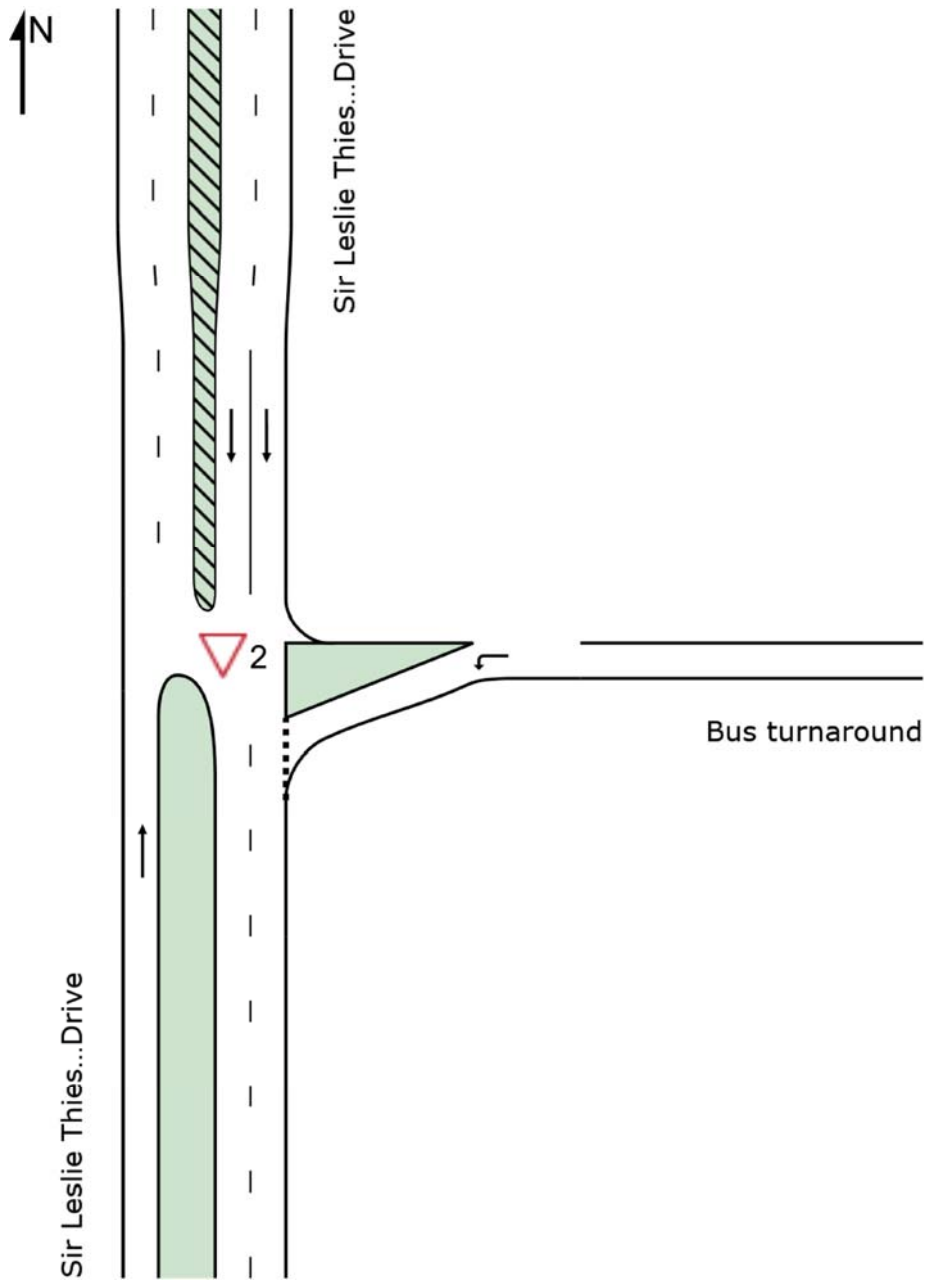
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 2 [2A]

Bus turnaround exit
Morning peak hour traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Sir Leslie Thiess Drive												
2	T1	208	0.5	0.107	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		208	0.5	0.107	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
East: Bus turnaround												
4	L2	1	100.0	0.001	6.4	LOS A	0.0	0.1	0.25	0.50	0.25	31.3
Approach		1	100.0	0.001	6.4	LOS A	0.0	0.1	0.25	0.50	0.25	31.3
North: Sir Leslie Thiess Drive												
8	T1	229	0.0	0.059	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		229	0.0	0.059	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
All Vehicles		439	0.5	0.107	0.0	NA	0.0	0.1	0.00	0.00	0.00	59.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
								Veh	Dist m				
South: Sir Leslie Thiess Drive													
Lane 1	208	0.5	1944	0.107	100	0.0	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	208	0.5		0.107		0.0	NA	0.0	0.0				
East: Bus turnaround													
Lane 1	1	100.0	943	0.001	100	6.4	LOS A	0.0	0.1	Full	100	0.0	0.0
Approach	1	100.0		0.001		6.4	LOS A	0.0	0.1				
North: Sir Leslie Thiess Drive													
Lane 1	115	0.0	1950	0.059	100	0.0	LOS A	0.0	0.0	Full	50	0.0	0.0
Lane 2	115	0.0	1950	0.059	100	0.0	LOS A	0.0	0.0	Full	50	0.0	0.0
Approach	229	0.0		0.059		0.0	NA	0.0	0.0				
Intersection	439	0.5		0.107		0.0	NA	0.0	0.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

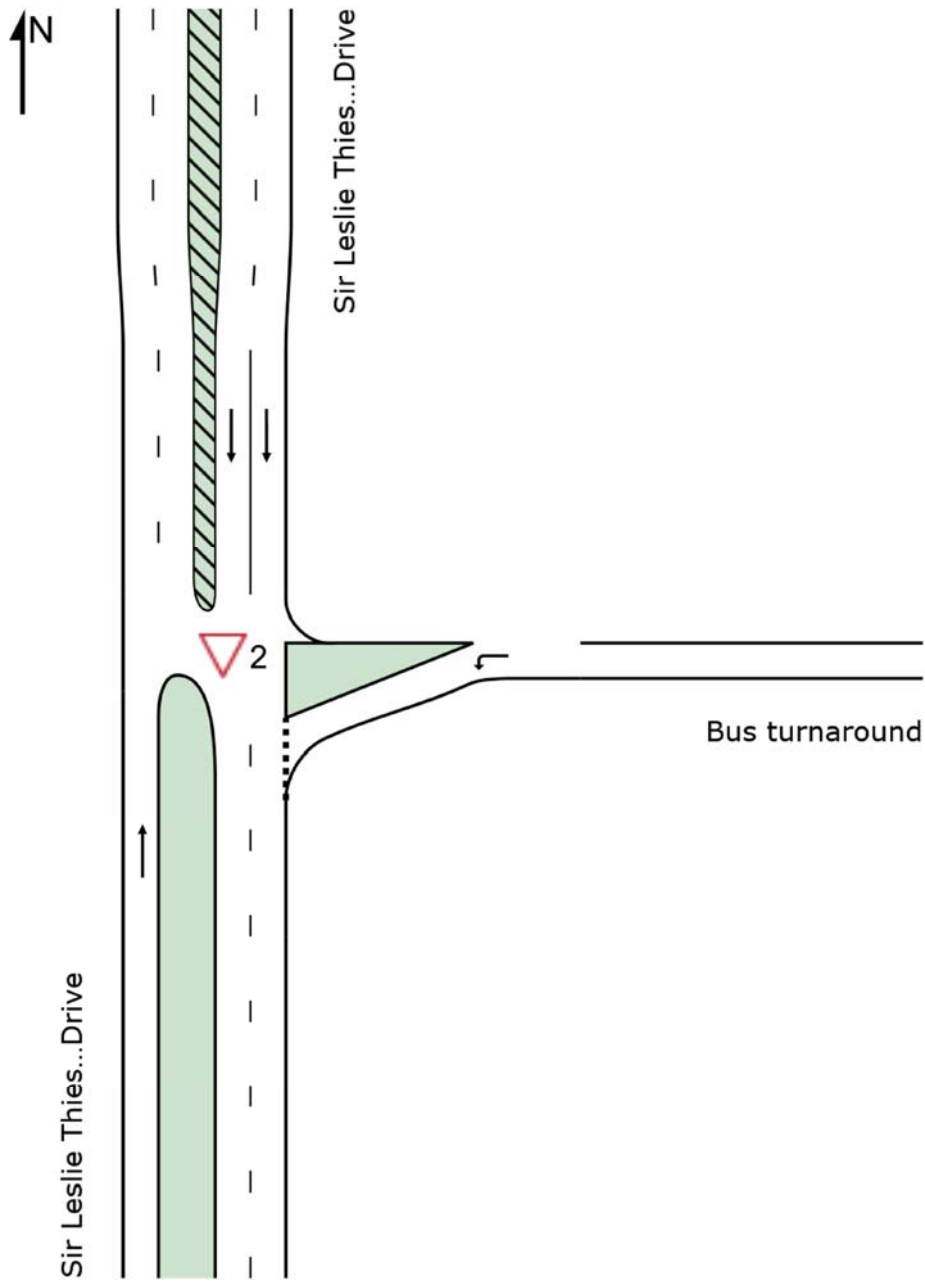
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 2 [2P]

Bus turnaround exit
Evening peak hour traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Sir Leslie Thiess Drive												
2	T1	215	0.5	0.110	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		215	0.5	0.110	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
East: Bus turnaround												
4	L2	1	100.0	0.001	6.5	LOS A	0.0	0.1	0.26	0.50	0.26	31.1
Approach		1	100.0	0.001	6.5	LOS A	0.0	0.1	0.26	0.50	0.26	31.1
North: Sir Leslie Thiess Drive												
8	T1	252	0.0	0.065	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		252	0.0	0.065	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
All Vehicles		467	0.5	0.110	0.0	NA	0.0	0.1	0.00	0.00	0.00	59.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV						Veh	Dist				
	veh/h	%											
South: Sir Leslie Thiess Drive													
Lane 1	215	0.5	1944	0.110	100	0.0	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	215	0.5		0.110		0.0	NA	0.0	0.0				
East: Bus turnaround													
Lane 1	1	100.0	929	0.001	100	6.5	LOS A	0.0	0.1	Full	100	0.0	0.0
Approach	1	100.0		0.001		6.5	LOS A	0.0	0.1				
North: Sir Leslie Thiess Drive													
Lane 1	126	0.0	1950	0.065	100	0.0	LOS A	0.0	0.0	Full	50	0.0	0.0
Lane 2	126	0.0	1950	0.065	100	0.0	LOS A	0.0	0.0	Full	50	0.0	0.0
Approach	252	0.0		0.065		0.0	NA	0.0	0.0				
Intersection	467	0.5		0.110		0.0	NA	0.0	0.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 3 [3A]

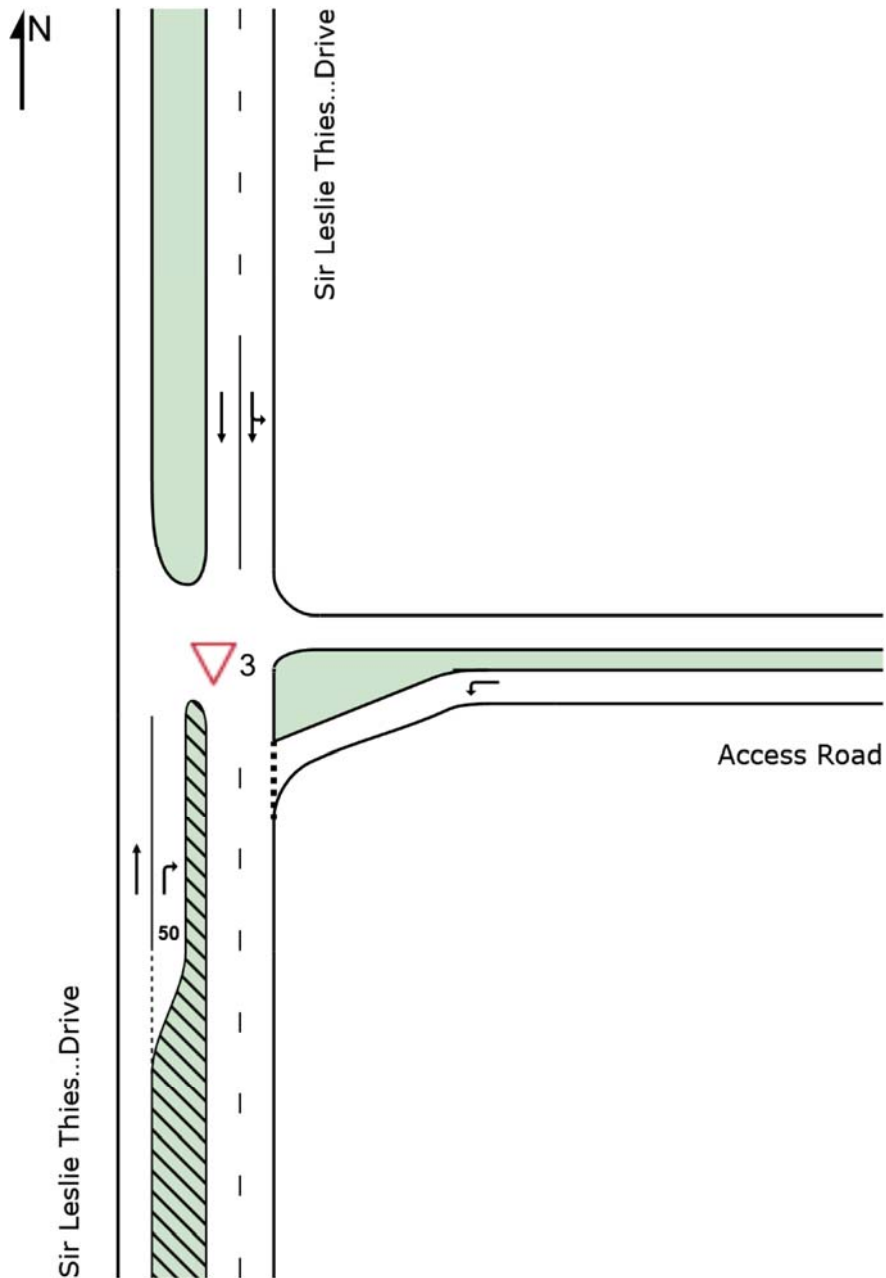
Sir Leslie Thiess Drive / access road intersection

Morning peak hour traffic

Site Category: (None)

Giveaway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Sir Leslie Thiess Drive												
2	T1	208	0.5	0.108	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	311	4.4	0.277	6.8	LOS A	1.3	9.6	0.39	0.64	0.39	31.2
Approach		519	2.8	0.277	4.1	NA	1.3	9.6	0.24	0.38	0.24	38.5
East: Access Road												
4	L2	13	0.0	0.011	3.1	LOS A	0.0	0.3	0.20	0.54	0.20	42.2
Approach		13	0.0	0.011	3.1	LOS A	0.0	0.3	0.20	0.54	0.20	42.2
North: Sir Leslie Thiess Drive												
7	L2	1	0.0	0.060	2.5	LOS A	0.0	0.0	0.00	0.00	0.00	13.3
8	T1	231	0.5	0.060	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		232	0.5	0.060	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.6
All Vehicles		763	2.1	0.277	2.8	NA	1.3	9.6	0.16	0.27	0.16	43.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV						Veh	Dist				
	veh/h	%											
South: Sir Leslie Thiess Drive													
Lane 1	208	0.5	1925	0.108	100	0.0	LOS A	0.0	0.0	Full	120	0.0	0.0
Lane 2	311	4.4	1120	0.277	100	6.8	LOS A	1.3	9.6	Short	50	0.0	NA
Approach	519	2.8		0.277		4.1	NA	1.3	9.6				
East: Access Road													
Lane 1	13	0.0	1200	0.011	100	3.1	LOS A	0.0	0.3	Full	15	0.0	0.0
Approach	13	0.0		0.011		3.1	LOS A	0.0	0.3				
North: Sir Leslie Thiess Drive													
Lane 1	116	0.5	1943	0.060	100	0.0	LOS A	0.0	0.0	Full	15	0.0	0.0
Lane 2	116	0.5	1944	0.060	100	0.0	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	232	0.5		0.060		0.0	NA	0.0	0.0				
Intersection	763	2.1		0.277		2.8	NA	1.3	9.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 3 [3P]

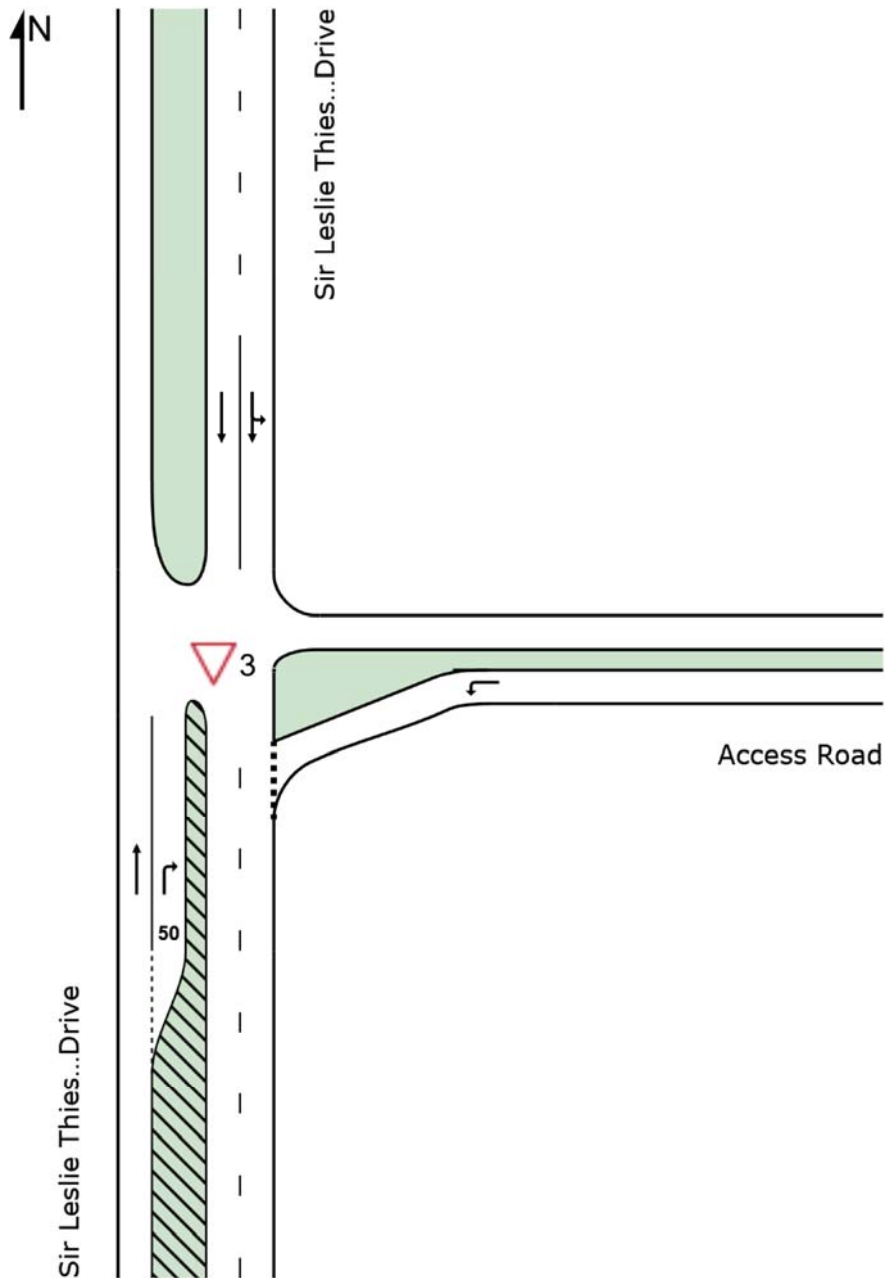
Sir Leslie Thiess Drive / access road intersection

Evening peak hour traffic

Site Category: (None)

Giveaway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Sir Leslie Thiess Drive												
2	T1	215	0.5	0.111	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	203	3.1	0.184	6.8	LOS A	0.8	5.8	0.38	0.64	0.38	31.3
Approach		418	1.8	0.184	3.3	NA	0.8	5.8	0.18	0.31	0.18	41.3
East: Access Road												
4	L2	16	0.0	0.013	3.2	LOS A	0.0	0.3	0.21	0.54	0.21	42.1
Approach		16	0.0	0.013	3.2	LOS A	0.0	0.3	0.21	0.54	0.21	42.1
North: Sir Leslie Thiess Drive												
7	L2	1	0.0	0.065	2.5	LOS A	0.0	0.0	0.00	0.00	0.00	13.3
8	T1	253	0.4	0.065	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		254	0.4	0.065	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.7
All Vehicles		687	1.2	0.184	2.1	NA	0.8	5.8	0.12	0.20	0.12	46.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
								Veh	Dist m				
South: Sir Leslie Thiess Drive													
Lane 1	215	0.5	1927	0.111	100	0.0	LOS A	0.0	0.0	Full	120	0.0	0.0
Lane 2	203	3.1	1106	0.184	100	6.8	LOS A	0.8	5.8	Short	50	0.0	NA
Approach	418	1.8		0.184		3.3	NA	0.8	5.8				
East: Access Road													
Lane 1	16	0.0	1188	0.013	100	3.2	LOS A	0.0	0.3	Full	15	0.0	0.0
Approach	16	0.0		0.013		3.2	LOS A	0.0	0.3				
North: Sir Leslie Thiess Drive													
Lane 1	127	0.4	1944	0.065	100	0.0	LOS A	0.0	0.0	Full	15	0.0	0.0
Lane 2	127	0.4	1945	0.065	100	0.0	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	254	0.4		0.065		0.0	NA	0.0	0.0				
Intersection	687	1.2		0.184		2.1	NA	0.8	5.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

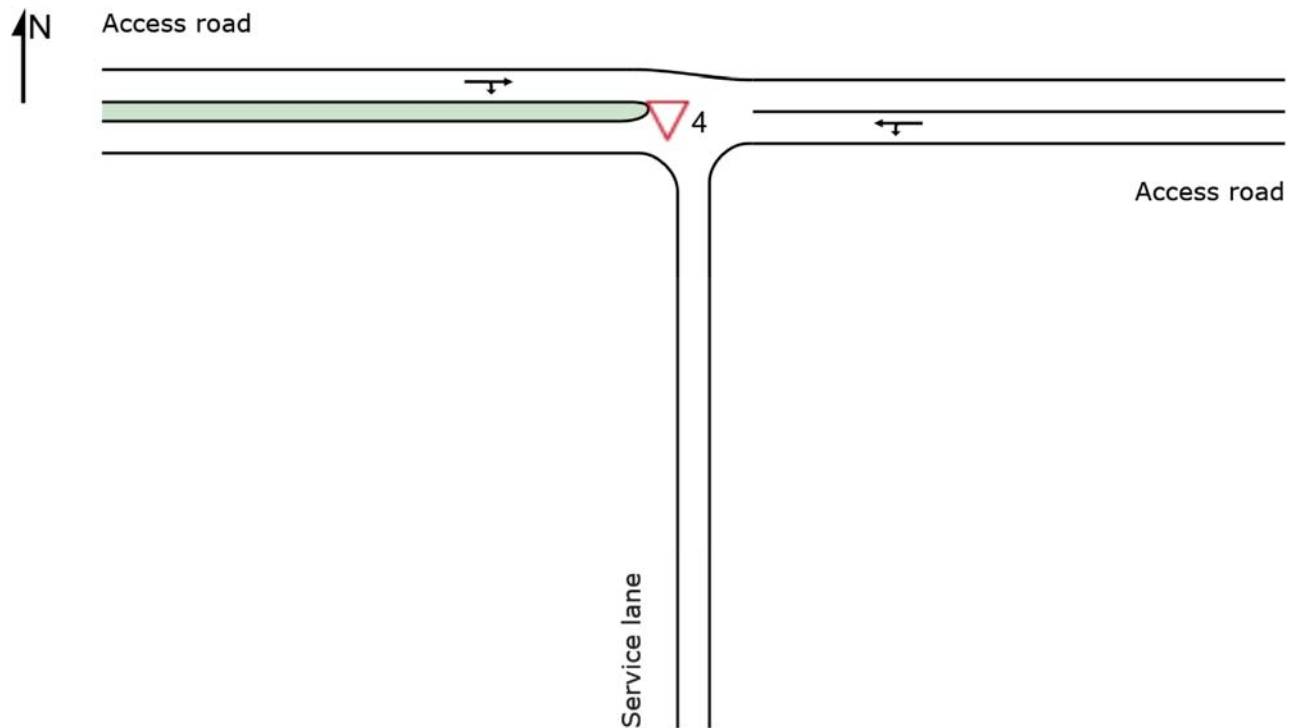
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 4 [4A]

Service lane entry
Morning peak hour traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Access road												
4	L2	1	0.0	0.007	2.5	LOS A	0.0	0.0	0.00	0.04	0.00	37.9
5	T1	13	0.0	0.007	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	55.6
Approach		14	0.0	0.007	0.2	NA	0.0	0.0	0.00	0.04	0.00	53.7
West: Access road												
11	T1	13	0.0	0.179	0.0	LOS A	0.9	6.9	0.07	0.55	0.07	30.1
12	R2	298	4.6	0.179	2.4	LOS A	0.9	6.9	0.07	0.55	0.07	22.7
Approach		311	4.4	0.179	2.3	NA	0.9	6.9	0.07	0.55	0.07	22.9
All Vehicles		324	4.2	0.179	2.2	NA	0.9	6.9	0.07	0.53	0.07	23.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
								Veh	Dist m				
East: Access road													
Lane 1	14	0.0	1943	0.007	100	0.2	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	14	0.0		0.007		0.2	NA	0.0	0.0				
West: Access road													
Lane 1	311	4.4	1738	0.179	100	2.3	LOS A	0.9	6.9	Full	15	0.0	0.0
Approach	311	4.4		0.179		2.3	NA	0.9	6.9				
Intersection	324	4.2		0.179		2.2	NA	0.9	6.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

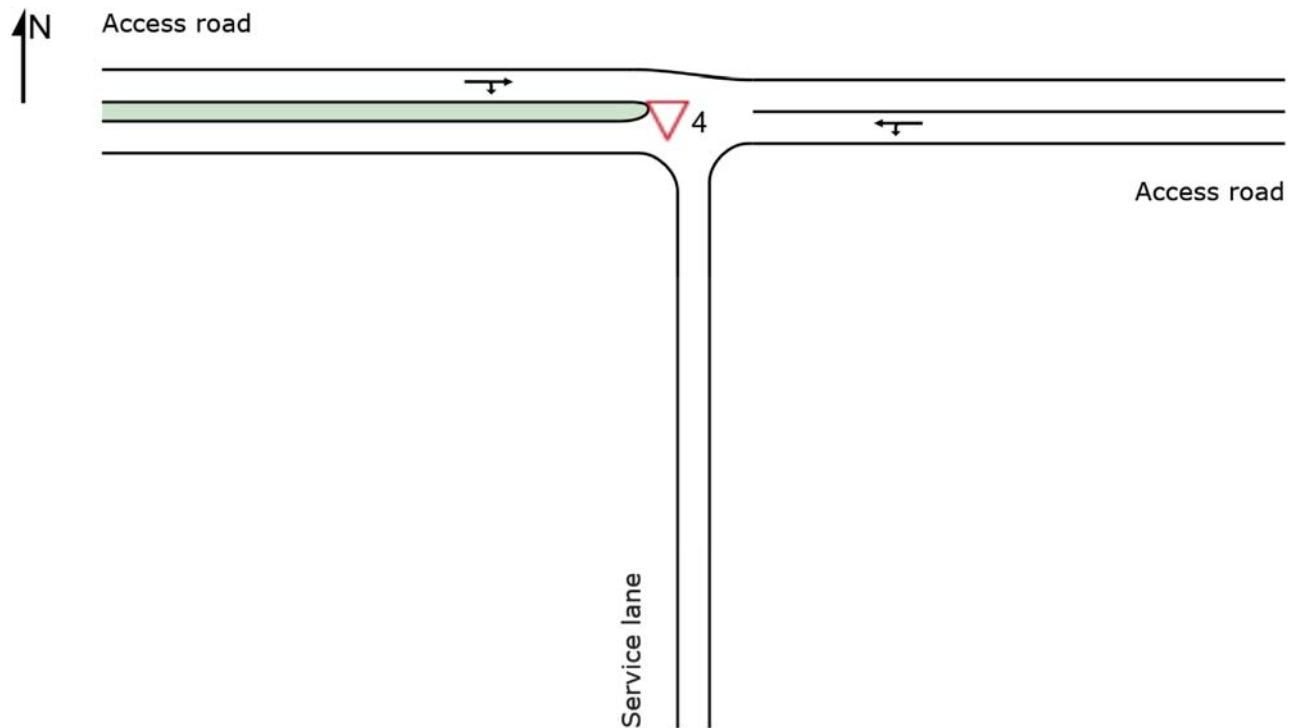
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 4 [4P]

Service lane entry
Evening peak hour traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Access road												
4	L2	21	0.0	0.019	2.5	LOS A	0.0	0.0	0.00	0.32	0.00	29.8
5	T1	16	0.0	0.019	0.0	LOS A	0.0	0.0	0.00	0.32	0.00	38.8
Approach		37	0.0	0.019	1.4	NA	0.0	0.0	0.00	0.32	0.00	33.1
West: Access road												
11	T1	37	0.0	0.117	0.1	LOS A	0.6	4.2	0.12	0.46	0.12	32.0
12	R2	166	3.8	0.117	2.5	LOS A	0.6	4.2	0.12	0.46	0.12	23.7
Approach		203	3.1	0.117	2.1	NA	0.6	4.2	0.12	0.46	0.12	24.9
All Vehicles		240	2.6	0.117	2.0	NA	0.6	4.2	0.10	0.44	0.10	26.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
								Veh	Dist m				
East: Access road													
Lane 1	37	0.0	1896	0.019	100	1.4	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	37	0.0		0.019		1.4	NA	0.0	0.0				
West: Access road													
Lane 1	203	3.1	1732	0.117	100	2.1	LOS A	0.6	4.2	Full	15	0.0	0.0
Approach	203	3.1		0.117		2.1	NA	0.6	4.2				
Intersection	240	2.6		0.117		2.0	NA	0.6	4.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

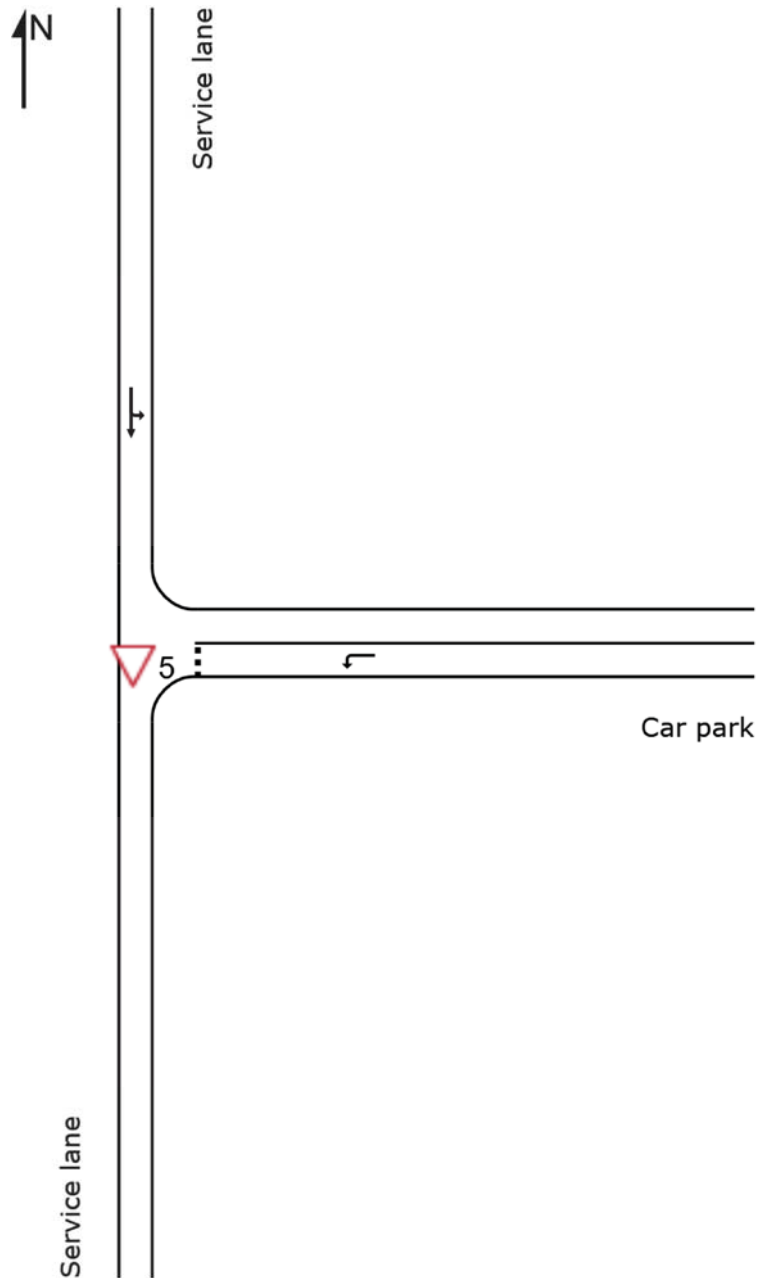
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 5 [5A]

Car park access
Morning peak hour traffic
Site Category: (None)
Giveaway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Car park												
4	L2	17	0.0	0.012	2.9	LOS A	0.0	0.3	0.24	0.52	0.24	22.9
Approach		17	0.0	0.012	2.9	LOS A	0.0	0.3	0.24	0.52	0.24	22.9
North: Service lane												
7	L2	147	0.0	0.161	2.5	LOS A	0.0	0.0	0.00	0.27	0.00	28.7
8	T1	151	9.1	0.161	0.0	LOS A	0.0	0.0	0.00	0.27	0.00	36.4
Approach		298	4.6	0.161	1.2	NA	0.0	0.0	0.00	0.27	0.00	31.6
All Vehicles		315	4.3	0.161	1.3	NA	0.0	0.3	0.01	0.29	0.01	31.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
East: Car park													
Lane 1	17	0.0	1430	0.012	100	2.9	LOS A	0.0	0.3	Full	15	0.0	0.0
Approach	17	0.0		0.012		2.9	LOS A	0.0	0.3				
North: Service lane													
Lane 1	298	4.6	1849	0.161	100	1.2	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	298	4.6		0.161		1.2	NA	0.0	0.0				
Intersection	315	4.3		0.161		1.3	NA	0.0	0.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

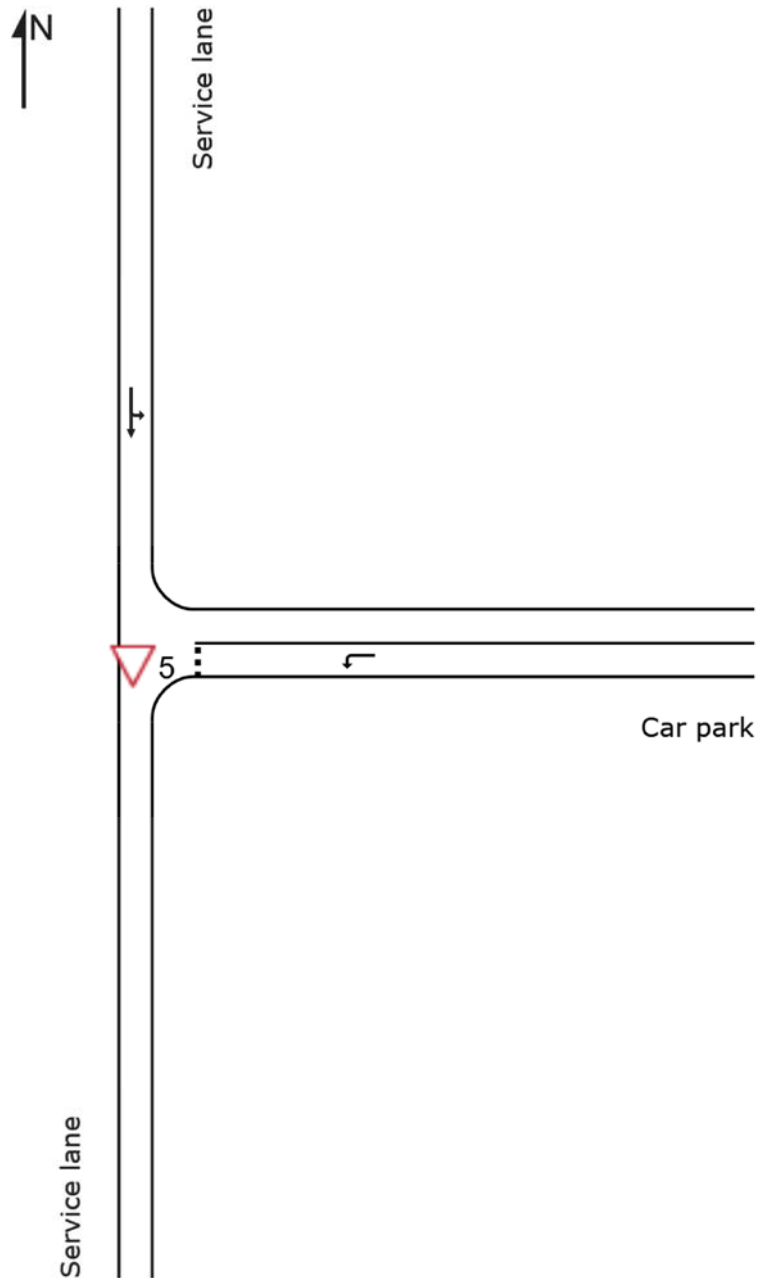
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 5 [5P]

Car park access
Evening peak hour traffic
Site Category: (None)
Giveaway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Car park												
4	L2	193	0.0	0.133	3.0	LOS A	0.6	4.0	0.25	0.55	0.25	22.8
Approach		193	0.0	0.133	3.0	LOS A	0.6	4.0	0.25	0.55	0.25	22.8
North: Service lane												
7	L2	46	0.0	0.099	2.5	LOS A	0.0	0.0	0.00	0.14	0.00	32.2
8	T1	141	4.5	0.099	0.0	LOS A	0.0	0.0	0.00	0.14	0.00	44.9
Approach		187	3.4	0.099	0.6	NA	0.0	0.0	0.00	0.14	0.00	40.1
All Vehicles		380	1.7	0.133	1.8	NA	0.6	4.0	0.13	0.34	0.13	28.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
								Veh	Dist m				
East: Car park													
Lane 1	193	0.0	1447	0.133	100	3.0	LOS A	0.6	4.0	Full	15	0.0	0.0
Approach	193	0.0		0.133		3.0	LOS A	0.6	4.0				
North: Service lane													
Lane 1	187	3.4	1885	0.099	100	0.6	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	187	3.4		0.099		0.6	NA	0.0	0.0				
Intersection	380	1.7		0.133		1.8	NA	0.6	4.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

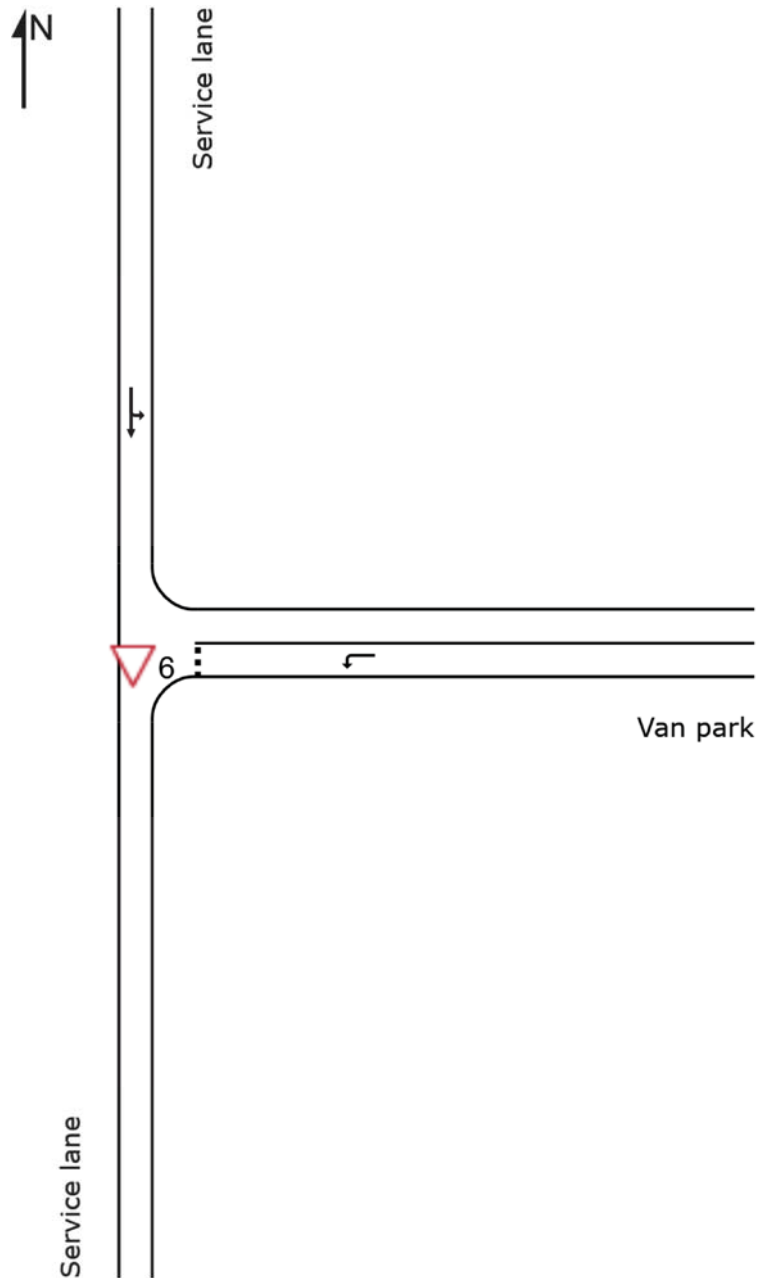
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 6 [6A]

Van park access
Morning peak hour traffic
Site Category: (None)
Giveaway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Van park												
4	L2	1	0.0	0.001	3.3	LOS A	0.0	0.0	0.29	0.50	0.29	22.7
Approach		1	0.0	0.001	3.3	LOS A	0.0	0.0	0.29	0.50	0.29	22.7
North: Service lane												
7	L2	2	0.0	0.090	2.1	LOS A	0.0	0.0	0.00	0.01	0.00	27.4
8	T1	165	8.3	0.090	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.1
Approach		167	8.2	0.090	0.0	NA	0.0	0.0	0.00	0.01	0.00	58.2
All Vehicles		168	8.1	0.090	0.0	NA	0.0	0.0	0.00	0.01	0.00	57.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
								Veh	Dist m				
East: Van park													
Lane 1	1	0.0	1037	0.001	100	3.3	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	1	0.0		0.001		3.3	LOS A	0.0	0.0				
North: Service lane													
Lane 1	167	8.2	1850	0.090	100	0.0	LOS A	0.0	0.0	Full	5	0.0	0.0
Approach	167	8.2		0.090		0.0	NA	0.0	0.0				
Intersection	168	8.1		0.090		0.0	NA	0.0	0.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

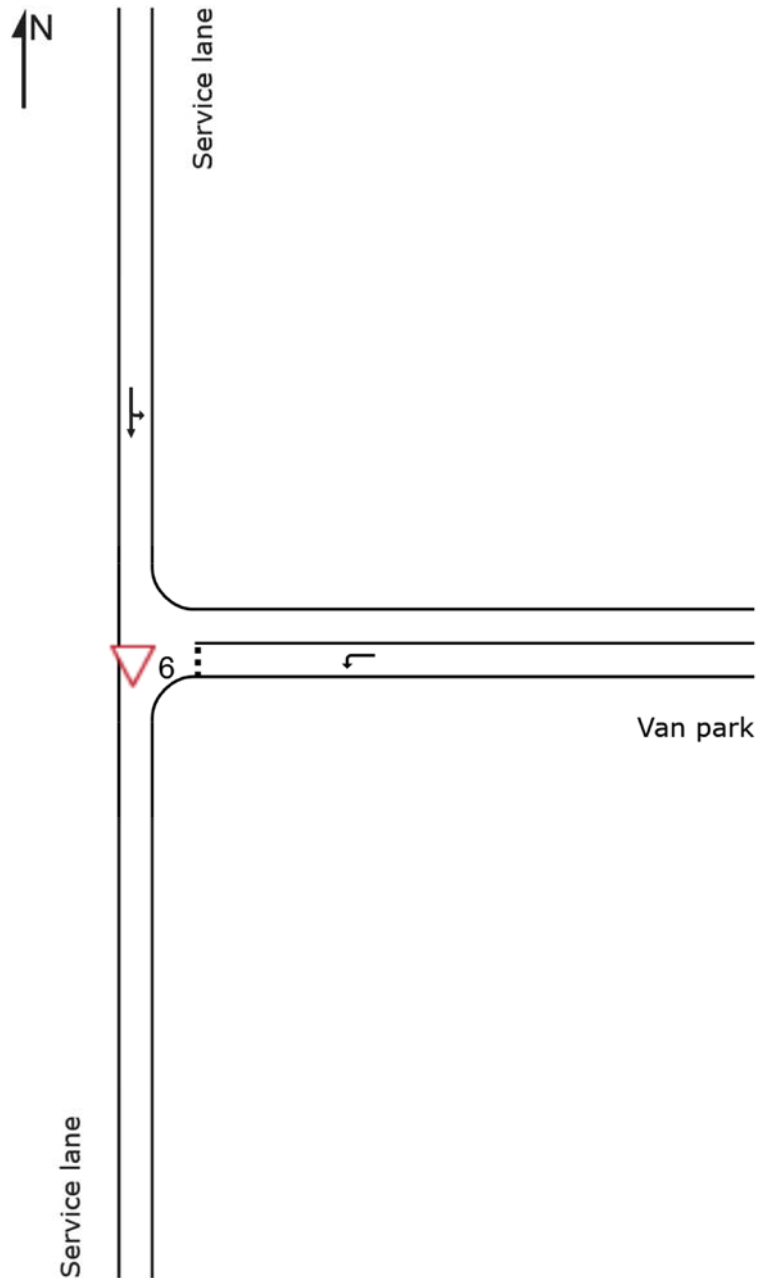
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 6 [6P]

Van park access
Evening peak hour traffic
Site Category: (None)
Giveaway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Van park												
4	L2	2	0.0	0.003	4.3	LOS A	0.0	0.1	0.43	0.55	0.43	19.8
Approach		2	0.0	0.003	4.3	LOS A	0.0	0.1	0.43	0.55	0.43	19.8
North: Service lane												
7	L2	1	0.0	0.174	2.1	LOS A	0.0	0.0	0.00	0.00	0.00	27.5
8	T1	334	1.9	0.174	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		335	1.9	0.174	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.5
All Vehicles		337	1.9	0.174	0.0	NA	0.0	0.1	0.00	0.01	0.00	58.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
East: Van park													
Lane 1	2	0.0	837	0.003	100	4.3	LOS A	0.0	0.1	Full	15	0.0	0.0
Approach	2	0.0		0.003		4.3	LOS A	0.0	0.1				
North: Service lane													
Lane 1	335	1.9	1926	0.174	100	0.0	LOS A	0.0	0.0	Full	5	0.0	0.0
Approach	335	1.9		0.174		0.0	NA	0.0	0.0				
Intersection	337	1.9		0.174		0.0	NA	0.0	0.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

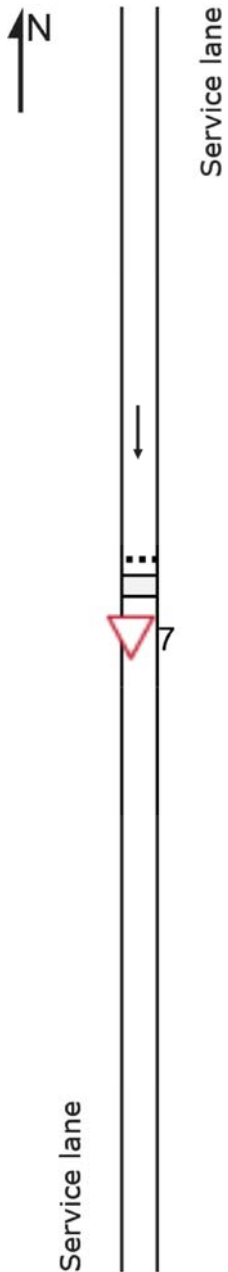
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 7 [7A]

Unsignalised pedestrian (Zebra) crossing across one-way road
Morning peak hour traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
North: Service lane												
2	T1	165	8.3	0.125	1.7	LOS A	0.5	3.5	0.20	0.45	0.20	34.5
Approach		165	8.3	0.125	1.7	LOS A	0.5	3.5	0.20	0.45	0.20	34.5
All Vehicles		165	8.3	0.125	1.7	NA	0.5	3.5	0.20	0.45	0.20	34.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
North: Service lane													
Lane 1	165	8.3	1318	0.125	100	1.7	LOS A	0.5	3.5	Full	15	0.0	0.0
Approach	165	8.3		0.125		1.7	LOS A	0.5	3.5				
Intersection	165	8.3		0.125		1.7	NA	0.5	3.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

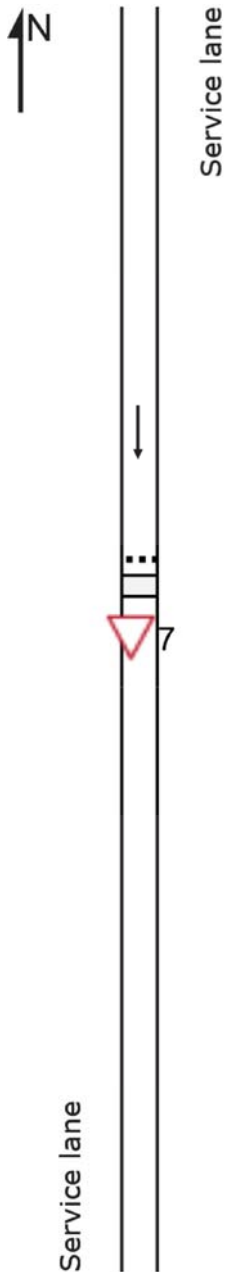
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 7 [7P]

Unsignalised pedestrian (Zebra) crossing across one-way road
Evening peak hour traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
North: Service lane												
2	T1	336	1.9	0.244	1.7	LOS A	1.0	7.3	0.20	0.45	0.20	34.7
Approach		336	1.9	0.244	1.7	LOS A	1.0	7.3	0.20	0.45	0.20	34.7
All Vehicles		336	1.9	0.244	1.7	NA	1.0	7.3	0.20	0.45	0.20	34.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
North: Service lane													
Lane 1	336	1.9	1375	0.244	100	1.7	LOS A	1.0	7.3	Full	15	0.0	0.0
Approach	336	1.9		0.244		1.7	LOS A	1.0	7.3				
Intersection	336	1.9		0.244		1.7	NA	1.0	7.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

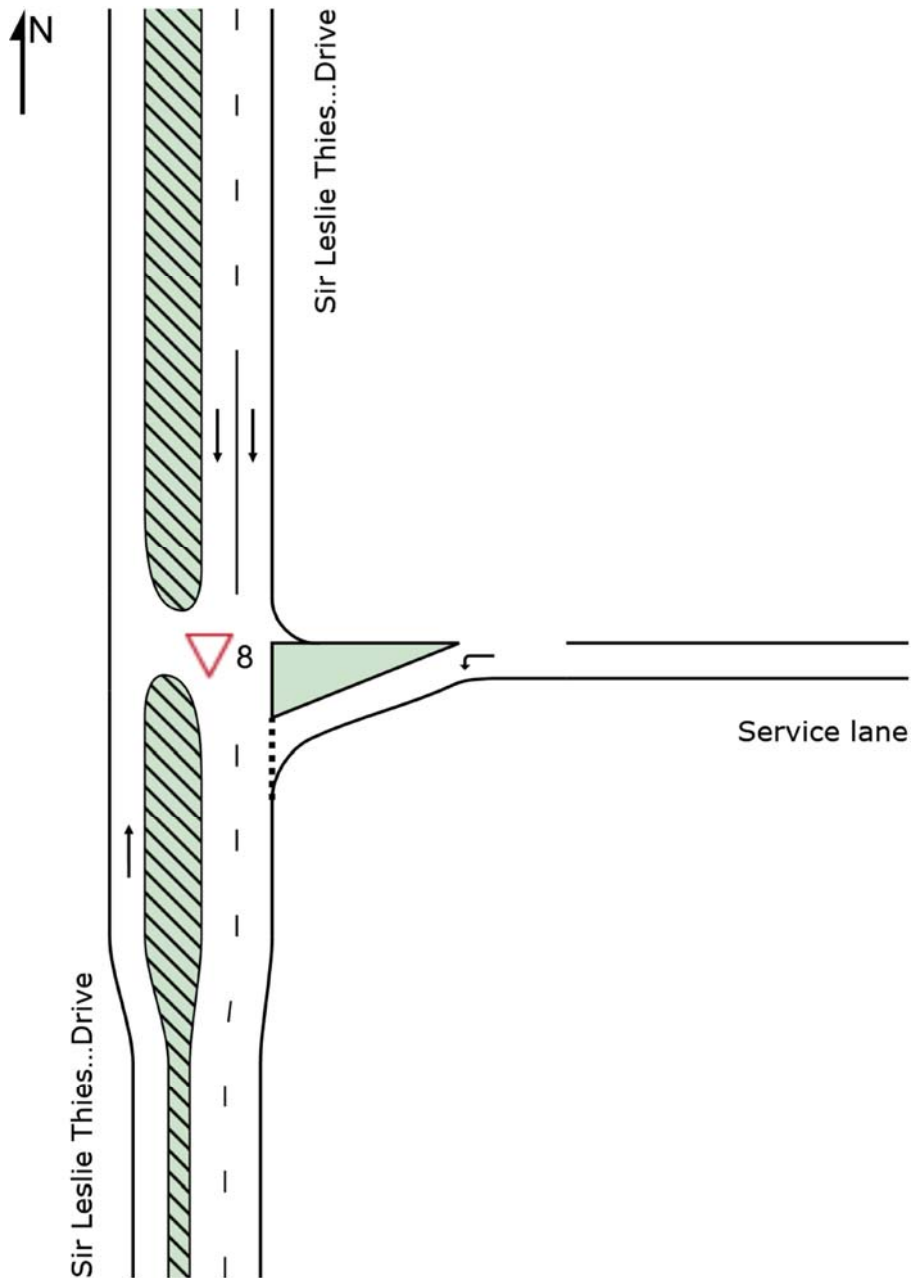
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 8 [8A]

Service lane exit
Morning peak hour traffic
Site Category: (None)
Giveaway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Sir Leslie Thiess Drive												
2	T1	519	2.8	0.271	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		519	2.8	0.271	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
East: Service lane												
4	L2	165	8.3	0.117	4.8	LOS A	0.5	3.7	0.23	0.56	0.23	29.3
Approach		165	8.3	0.117	4.8	LOS A	0.5	3.7	0.23	0.56	0.23	29.3
North: Sir Leslie Thiess Drive												
8	T1	243	0.4	0.063	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		243	0.4	0.063	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
All Vehicles		927	3.2	0.271	0.9	NA	0.5	3.7	0.04	0.10	0.04	52.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Sir Leslie Thiess Drive													
Lane 1	519	2.8	1915	0.271	100	0.0	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	519	2.8		0.271		0.0	NA	0.0	0.0				
East: Service lane													
Lane 1	165	8.3	1412	0.117	100	4.8	LOS A	0.5	3.7	Full	60	0.0	0.0
Approach	165	8.3		0.117		4.8	LOS A	0.5	3.7				
North: Sir Leslie Thiess Drive													
Lane 1	121	0.9	1939	0.063	100	0.0	LOS A	0.0	0.0	Full	120	0.0	0.0
Lane 2	122	0.0	1950	0.063	100	0.0	LOS A	0.0	0.0	Full	120	0.0	0.0
Approach	243	0.4		0.063		0.0	NA	0.0	0.0				
Intersection	927	3.2		0.271		0.9	NA	0.5	3.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

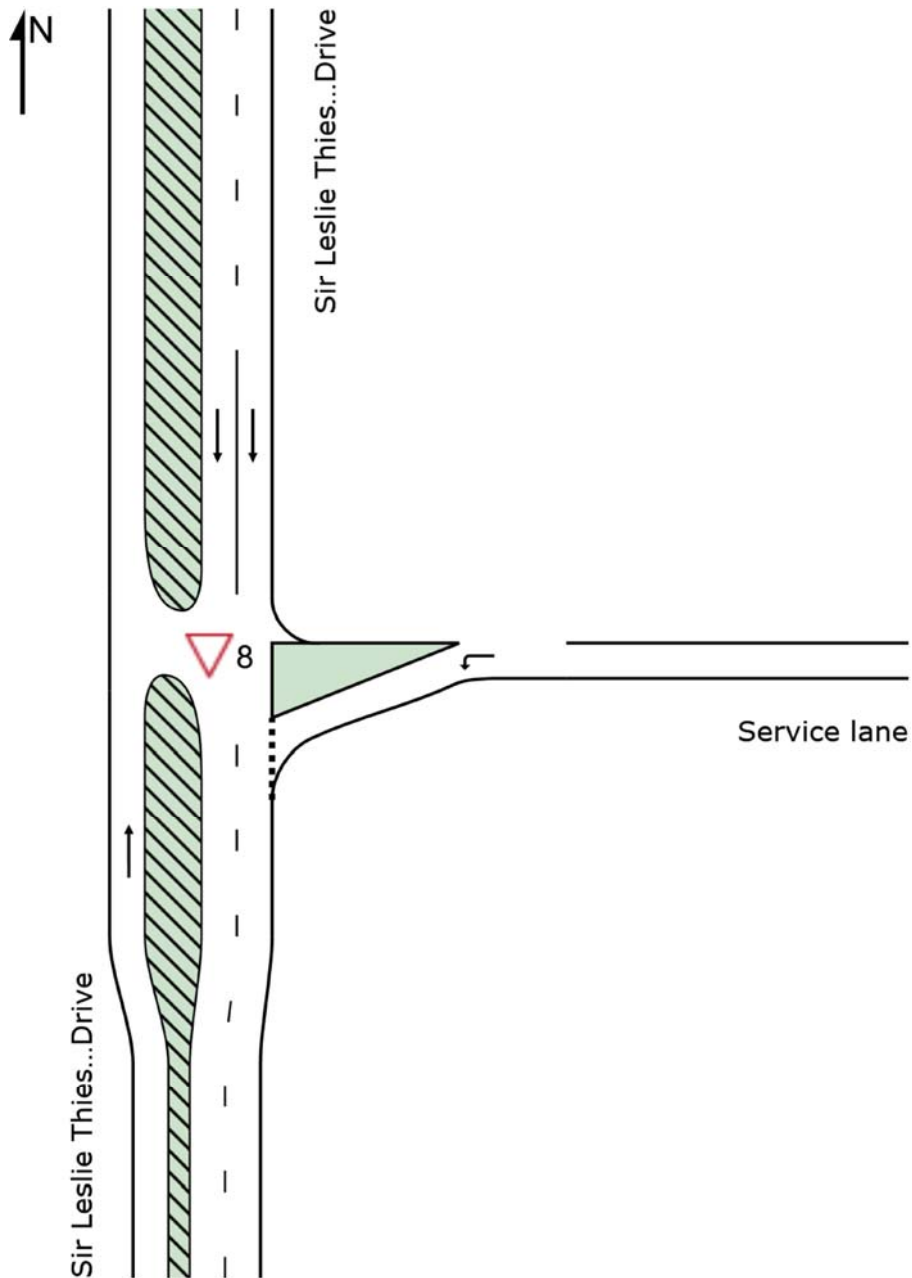
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 8 [8P]

Service lane exit
Evening peak hour traffic
Site Category: (None)
Giveaway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Sir Leslie Thiess Drive												
2	T1	418	1.8	0.217	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		418	1.8	0.217	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
East: Service lane												
4	L2	336	1.9	0.233	4.9	LOS A	1.1	7.8	0.27	0.57	0.27	29.1
Approach		336	1.9	0.233	4.9	LOS A	1.1	7.8	0.27	0.57	0.27	29.1
North: Sir Leslie Thiess Drive												
8	T1	268	0.4	0.069	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		268	0.4	0.069	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
All Vehicles		1022	1.4	0.233	1.6	NA	1.1	7.8	0.09	0.19	0.09	47.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Sir Leslie Thiess Drive													
Lane 1	418	1.8	1928	0.217	100	0.0	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	418	1.8		0.217		0.0	NA	0.0	0.0				
East: Service lane													
Lane 1	336	1.9	1442	0.233	100	4.9	LOS A	1.1	7.8	Full	60	0.0	0.0
Approach	336	1.9		0.233		4.9	LOS A	1.1	7.8				
North: Sir Leslie Thiess Drive													
Lane 1	134	0.8	1940	0.069	100	0.0	LOS A	0.0	0.0	Full	120	0.0	0.0
Lane 2	135	0.0	1950	0.069	100	0.0	LOS A	0.0	0.0	Full	120	0.0	0.0
Approach	268	0.4		0.069		0.0	NA	0.0	0.0				
Intersection	1022	1.4		0.233		1.6	NA	1.1	7.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

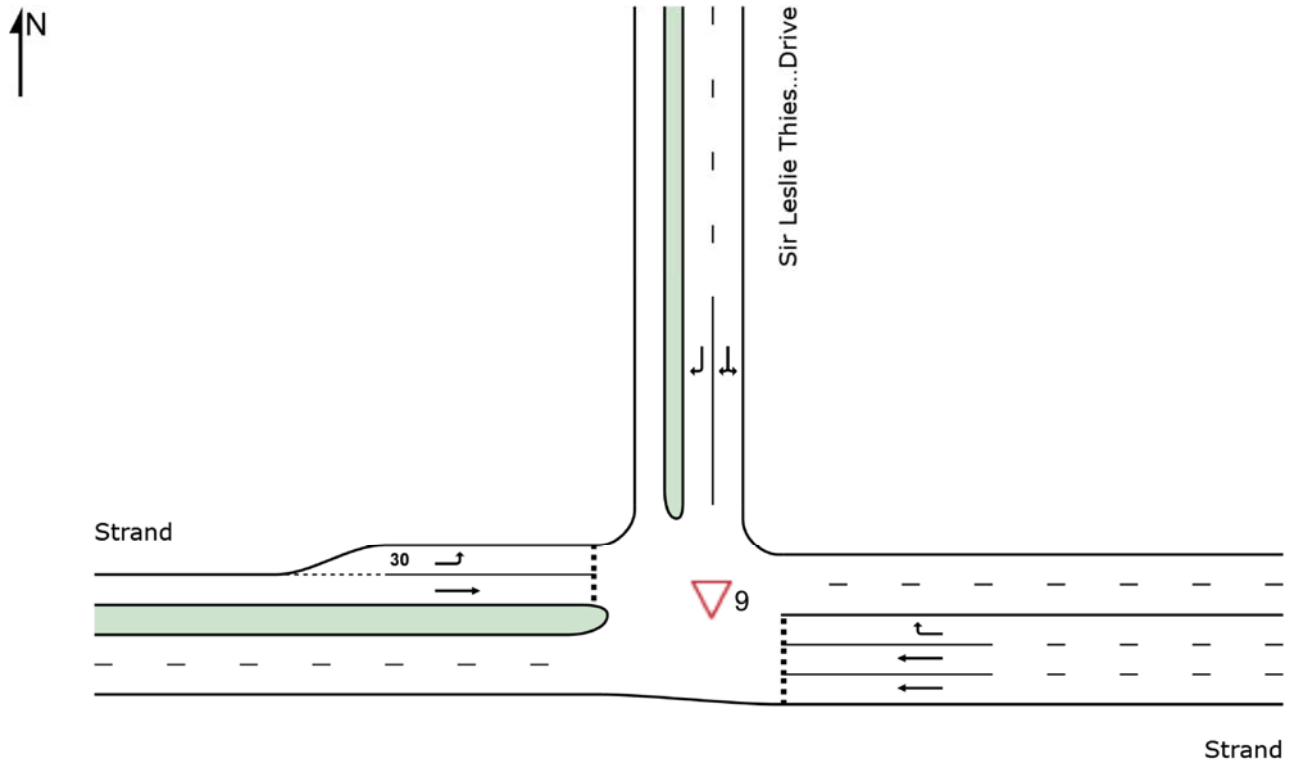
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

 Site: 9 [9A]

Strand / Sir Leslie Thiess Drive intersection
Morning peak hour traffic
Site Category: (None)
Giveaway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Strand												
5	T1	7	0.0	0.004	2.9	LOS A	0.0	0.1	0.39	0.48	0.39	29.6
6	R2	1	0.0	0.002	8.2	LOS A	0.0	0.1	0.64	0.66	0.64	13.5
Approach		8	0.0	0.004	3.6	LOS A	0.0	0.1	0.42	0.50	0.42	27.2
North: Sir Leslie Thiess Drive												
7	L2	1	0.0	0.113	2.5	LOS A	0.0	0.0	0.00	0.51	0.00	25.2
9	R2	408	3.6	0.113	2.4	LOS A	0.0	0.0	0.00	0.51	0.00	29.4
Approach		409	3.6	0.113	2.4	NA	0.0	0.0	0.00	0.51	0.00	29.4
West: Strand												
10	L2	519	2.8	0.285	3.9	LOS A	0.0	0.0	0.00	0.55	0.00	29.1
11	T1	7	0.0	0.007	4.2	LOS A	0.0	0.2	0.39	0.53	0.39	28.6
Approach		526	2.8	0.285	3.9	LOS A	0.0	0.2	0.01	0.55	0.01	29.1
All Vehicles		944	3.1	0.285	3.2	NA	0.0	0.2	0.01	0.53	0.01	29.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV						Veh	Dist				
	veh/h	%	veh/h	v/c	%	sec					m	%	%
East: Strand													
Lane 1	4	0.0	1050	0.004	100	2.9	LOS A	0.0	0.1	Full	15	0.0	0.0
Lane 2	4	0.0	1050	0.004	100	2.9	LOS A	0.0	0.1	Full	15	0.0	0.0
Lane 3	1	0.0	444	0.002	100	8.2	LOS A	0.0	0.1	Full	15	0.0	0.0
Approach	8	0.0		0.004		3.6	LOS A	0.0	0.1				
North: Sir Leslie Thiess Drive													
Lane 1	205	3.6	1811	0.113	100	2.4	LOS A	0.0	0.0	Full	15	0.0	0.0
Lane 2	205	3.6	1811	0.113	100	2.4	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	409	3.6		0.113		2.4	NA	0.0	0.0				
West: Strand													
Lane 1	519	2.8	1820	0.285	100	3.9	LOS A	0.0	0.0	Short	30	0.0	NA
Lane 2	7	0.0	1046	0.007	100	4.2	LOS A	0.0	0.2	Full	50	0.0	0.0
Approach	526	2.8		0.285		3.9	LOS A	0.0	0.2				
Intersection	944	3.1		0.285		3.2	NA	0.0	0.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

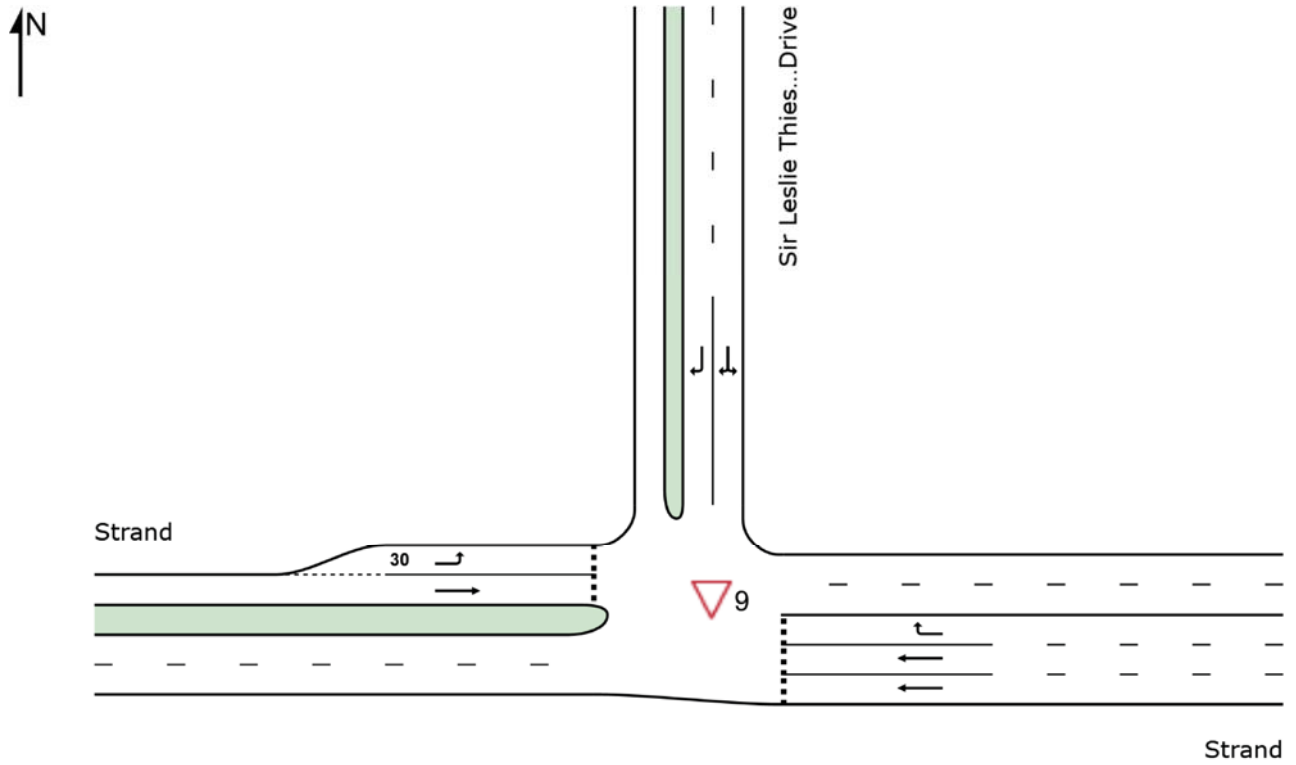
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

 Site: 9 [9P]

Strand / Sir Leslie Thiess Drive intersection
Evening peak hour traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Strand												
5	T1	7	0.0	0.004	3.8	LOS A	0.0	0.1	0.47	0.53	0.47	27.2
6	R2	1	0.0	0.003	8.8	LOS A	0.0	0.1	0.67	0.68	0.67	12.9
Approach		8	0.0	0.004	4.4	LOS A	0.0	0.1	0.50	0.55	0.50	25.1
North: Sir Leslie Thiess Drive												
7	L2	1	0.0	0.164	2.5	LOS A	0.0	0.0	0.00	0.51	0.00	25.2
9	R2	604	1.2	0.164	2.4	LOS A	0.0	0.0	0.00	0.51	0.00	29.4
Approach		605	1.2	0.164	2.4	NA	0.0	0.0	0.00	0.51	0.00	29.4
West: Strand												
10	L2	418	1.8	0.228	3.9	LOS A	0.0	0.0	0.00	0.55	0.00	29.1
11	T1	7	0.0	0.009	5.1	LOS A	0.0	0.2	0.47	0.58	0.47	26.3
Approach		425	1.7	0.228	3.9	LOS A	0.0	0.2	0.01	0.55	0.01	29.1
All Vehicles		1039	1.4	0.228	3.0	NA	0.0	0.2	0.01	0.53	0.01	29.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV						Veh	Dist				
	veh/h	%	veh/h	v/c	%	sec					m	%	%
East: Strand													
Lane 1	4	0.0	868	0.004	100	3.8	LOS A	0.0	0.1	Full	15	0.0	0.0
Lane 2	4	0.0	868	0.004	100	3.8	LOS A	0.0	0.1	Full	15	0.0	0.0
Lane 3	1	0.0	413	0.003	100	8.8	LOS A	0.0	0.1	Full	15	0.0	0.0
Approach	8	0.0		0.004		4.4	LOS A	0.0	0.1				
North: Sir Leslie Thiess Drive													
Lane 1	303	1.2	1841	0.164	100	2.4	LOS A	0.0	0.0	Full	15	0.0	0.0
Lane 2	303	1.2	1841	0.164	100	2.4	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	605	1.2		0.164		2.4	NA	0.0	0.0				
West: Strand													
Lane 1	418	1.8	1834	0.228	100	3.9	LOS A	0.0	0.0	Short	30	0.0	NA
Lane 2	7	0.0	864	0.009	100	5.1	LOS A	0.0	0.2	Full	50	0.0	0.0
Approach	425	1.7		0.228		3.9	LOS A	0.0	0.2				
Intersection	1039	1.4		0.228		3.0	NA	0.0	0.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK

 Project: HON0031-R02-rev1-SIDRA

Template: Standard Network
Report

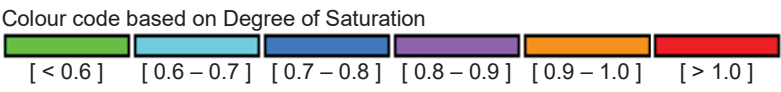
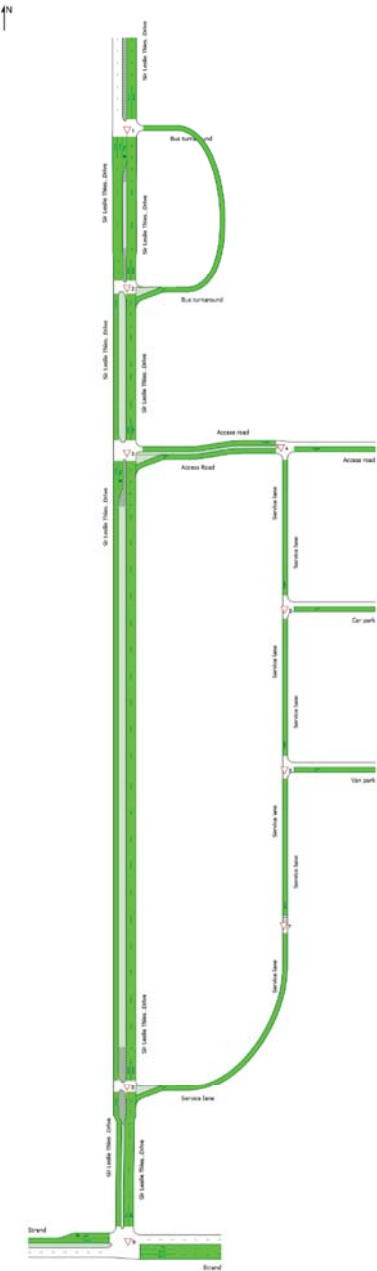
Network: N1 [A]

Townsville Marine Tourism Precinct
Morning peak hour traffic
Network Category: (None)

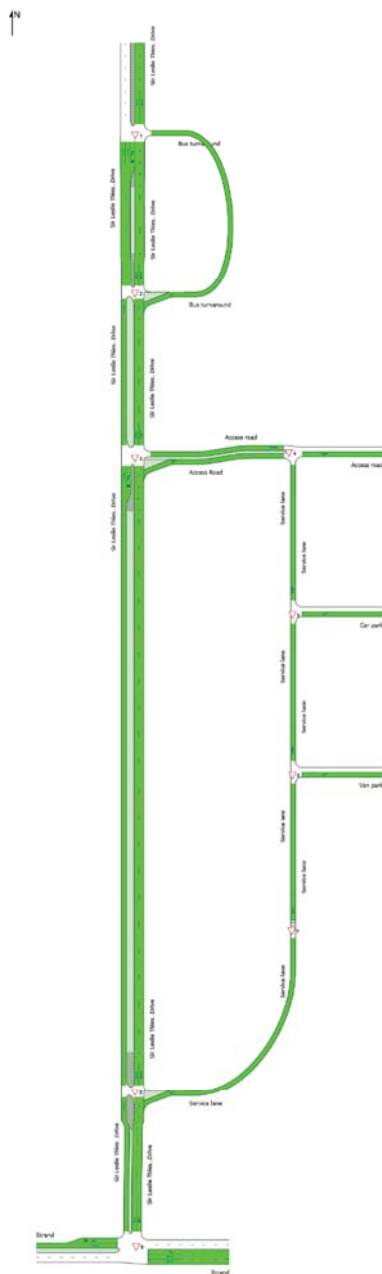
Network Layout



Degree of Saturation



Lane Level of Service



Colour code based on Level of Service



Delay model settings are specified for individual Sites forming the Network.

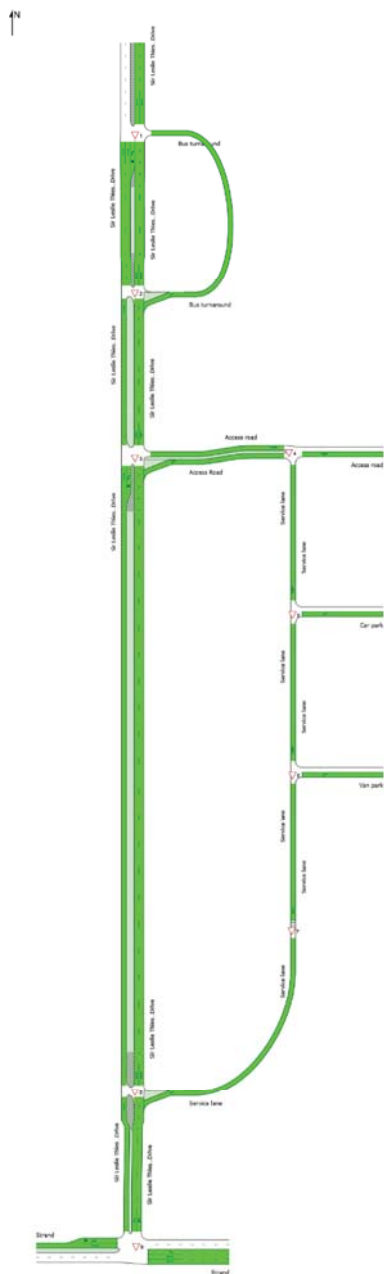
Network: N1 [P]

Townsville Marine Tourism Precinct
Evening peak hour traffic
Network Category: (None)

Network Layout



Degree of Saturation



Colour code based on Degree of Saturation



Lane Level of Service



ANNEXURE I
ADDENDUM TO TRAFFIC AND TRANSPORT IMPACT ASSESSMENT
(22 JULY 2019)

Our Ref: HON0031-L05

Contact: Russell Perkins

TOWNSVILLE
84 Denham St
PO Box 1110
Townsville Qld 4810
(07) 4772 0666

22 July 2019

The Manager
Honeycombes Property Group
281 Sturt Street
TOWNSVILLE QLD 4810

Attention: Mr Peter Honeycombe

Dear Peter

**TOWNSVILLE MARINE TOURISM PRECINCT – FERRY TERMINAL
ADDENDUM TO TRAFFIC AND TRANSPORT IMPACT ASSESSMENT**

This letter has been prepared in response to a minor amendment made to the Ground Level layout of the SeaLink Ferry Terminal. This letter is to be read in conjunction with the *Public Passenger Transport Assessment* (HON0031/R02revA) dated 17 July 2019 and the *Addendum to Traffic and Transport Impact Assessment* (HON0031-L04-BIJ) dated 17 July 2019.

We refer to Counterpoint Drawing No. DA200 Issue G dated 22 July 2019 (enclosed) showing changes to the service lane arrangements. The Taxi rank has moved from The Strand to the passenger set-down zone located in the service lane of the proposed building.

We confirm that the amendments made to the location of the taxi rank on the ground level, shown by the enclosed drawing, will not change the conclusions made in Premise report HON0031/R02revA dated 17 July 2019 or Premise letter HON0031-L04-BIJ dated 17 July 2019.

If you have any queries in relation to the above, please contact Mr Russell Perkins on (07) 4772 0666.

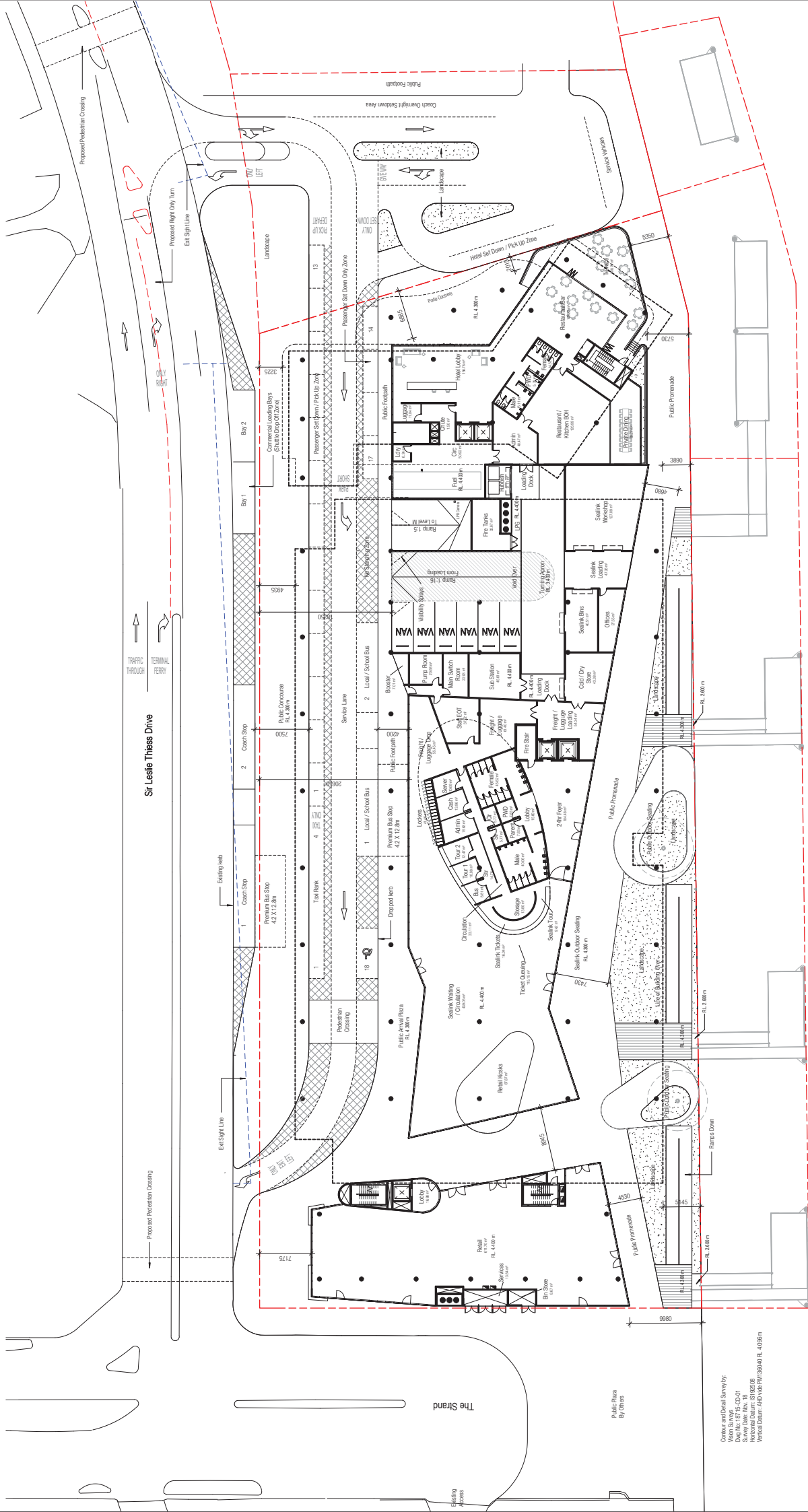
Yours faithfully

**Russell Perkins RPEQ**
Principal Engineer
Premise Australia Pty Ltd

Enc: Attachment A – Amended Ground Floor Drawing

Cc: Mr George Milford, Milford Planning Consultants (via email)

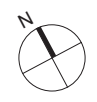
ATTACHMENT A
AMENDED GROUND FLOOR DRAWING



Ross Creek

Concur and Detail Survey by:
Vern Sullivan, P.E., CO-01
Survey Date: Nov. 18
Horizontal Datum: NAD 83
Vertical Datum: NAVD 83

DA - GROUND LEVEL PLAN
SCALE: 1" = 20'



CONTACT DETAILS
NAME: JEFFREY A. HONEYCOMBES
PHONE: 407.474.0000
EMAIL: JHONEYCOMBES@COUNTERPOINT.COM.AU
ADDRESS: 4075 S.W. 11TH AVE., SUITE 100
PO BOX 1004 TOWNVILLE QLD 4810
OFFICE: 41 INNESLAND TOWNVILLE QLD 4810

PROJECT
TOWNVILLE MARINE TOURISM PRECINCT
CLIENT DETAILS
HONEYCOMBES PROPERTY GROUP

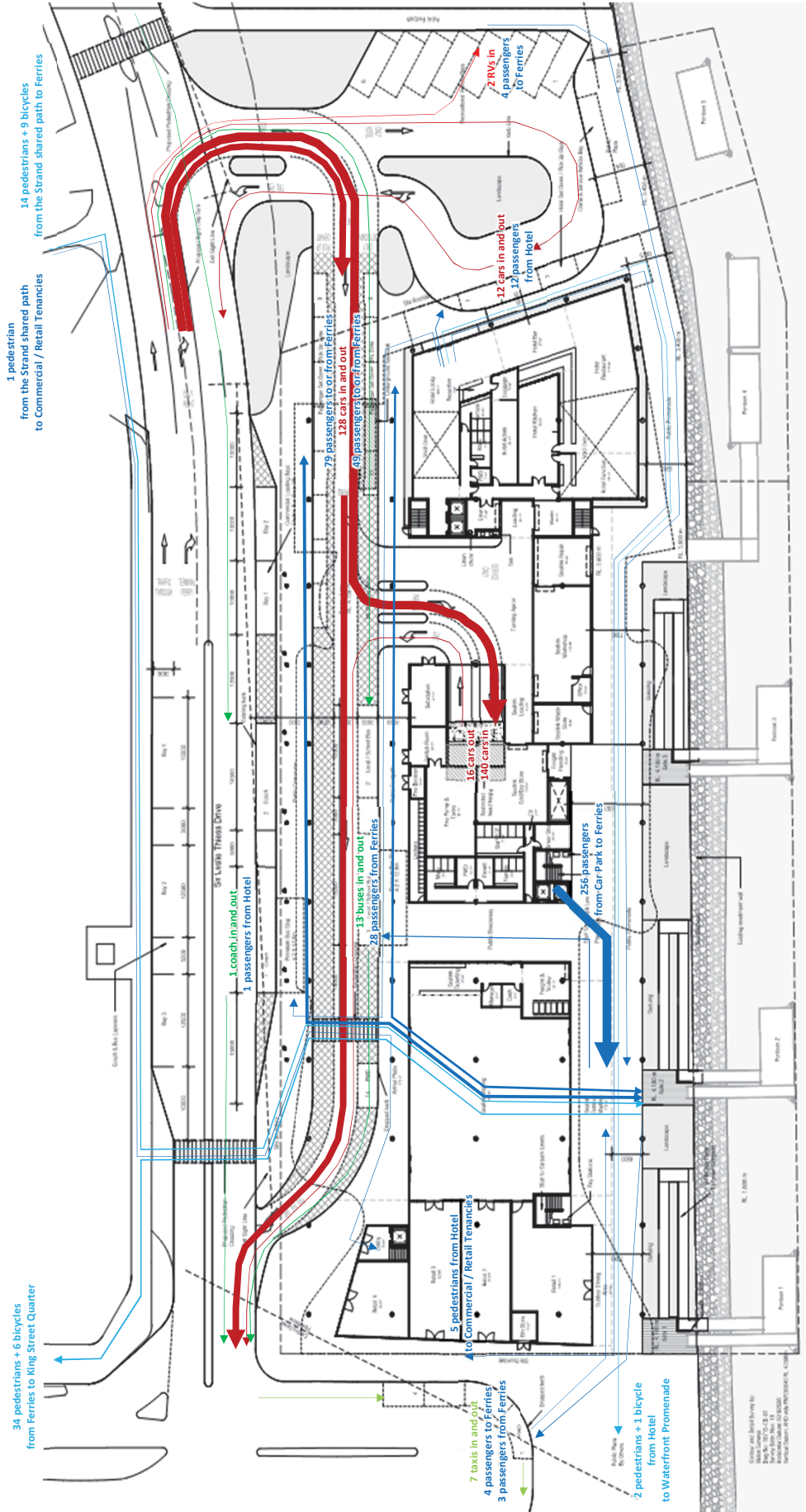
DETAILS
PROJECT No. 22/07/19
DATE 22/07/19
DRAWN BY JH
CHECKED BY JH
SCALE A1 1:250

REVISION
G 22/07/19 UPDATED SERVICE LANE
F 19/07/19 DA - RFI RESPONSE FINAL
E 17/07/19 DA - RFI RESPONSE
D 17/07/19 CONSULTANT ISSUE

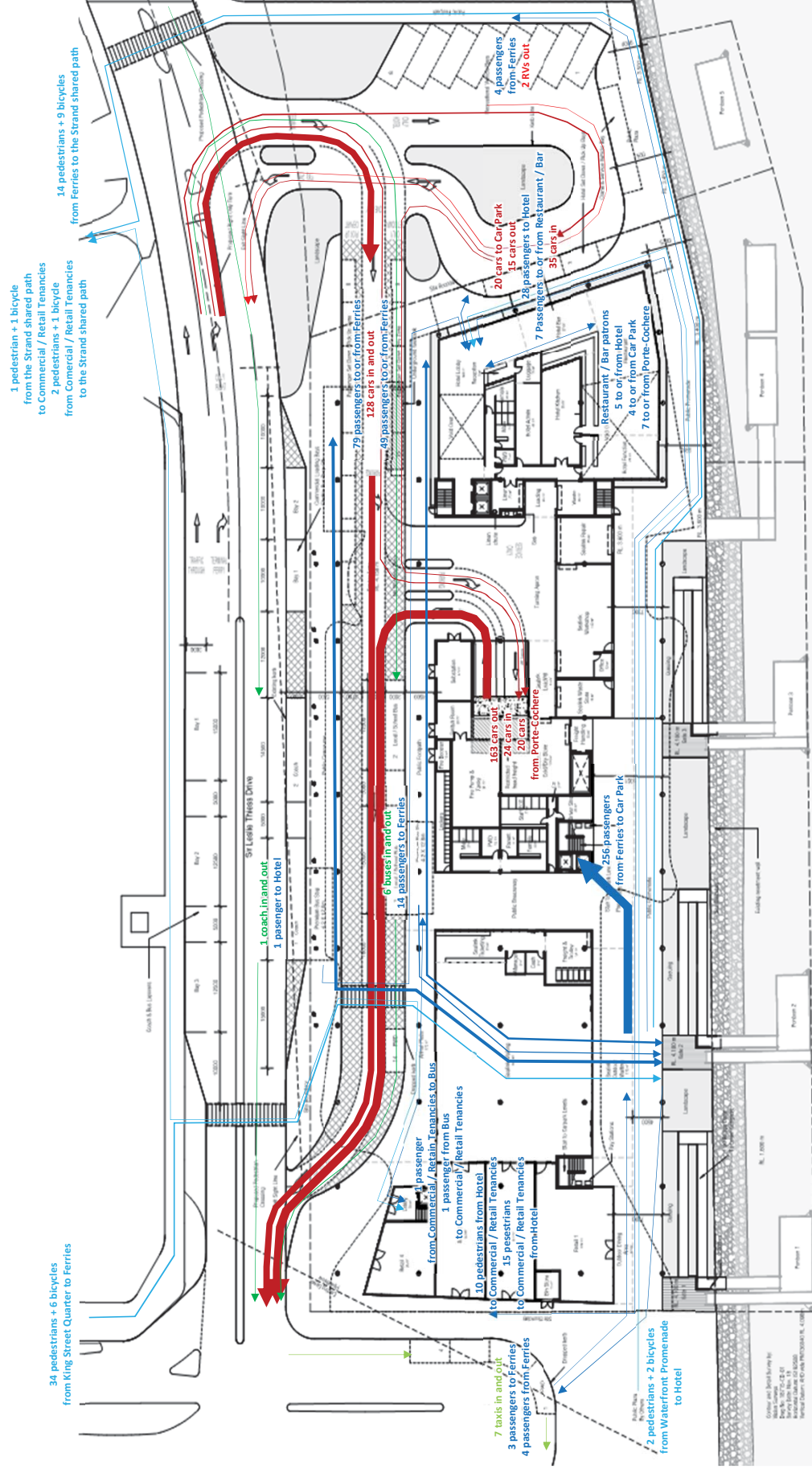
TITLE GROUND LEVEL
DRAWING No. DA000
ISSUE 6
DEVELOPMENT APPLICATION

ANNEXURE J
DEVELOPMENT TRAFFIC VOLUMES ON THE NETWORK

DEVELOPMENT TRAFFIC VOLUMES ON THE NETWORK - MORNING PEAK HOUR

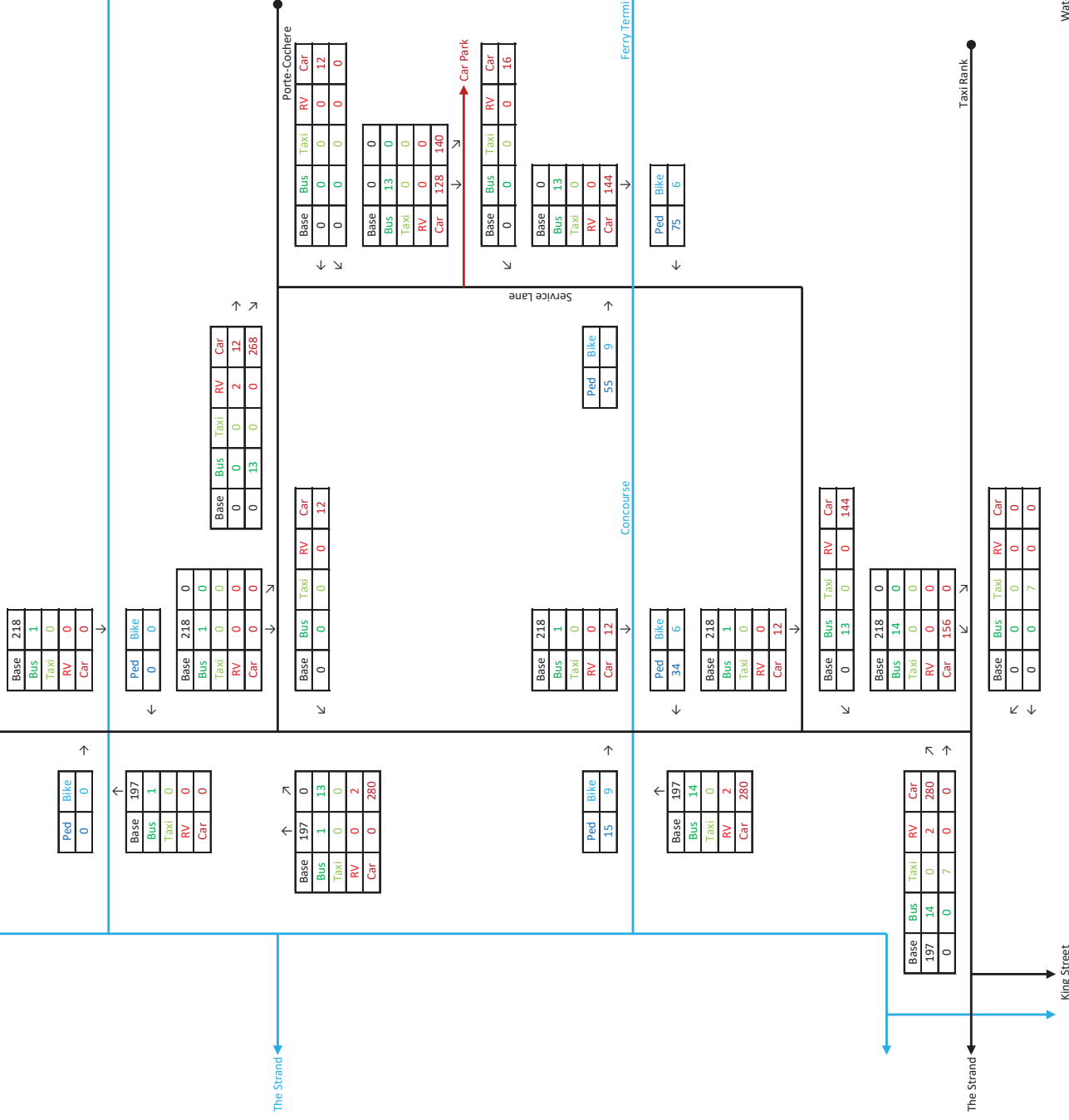


DEVELOPMENT TRAFFIC VOLUMES ON THE NETWORK - EVENING PEAK HOUR

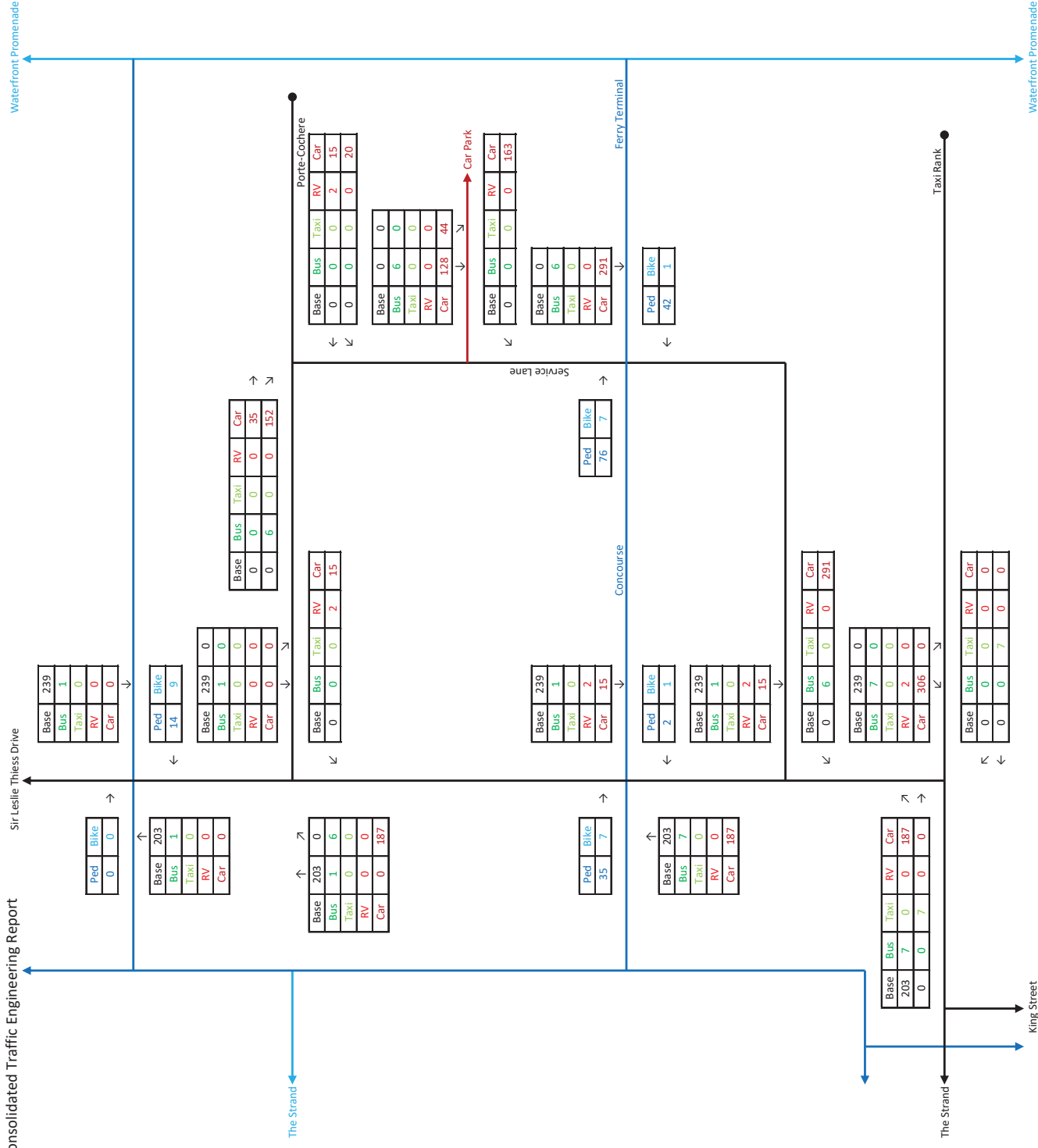


79 passengers to or from Car Park not at ground level

ANNEXURE K
‘WITH DEVELOPMENT’ TRAFFIC VOLUMES



WITH DEVELOPMENT TRAFFIC VOLUMES - MORNING PEAK HOUR



ANNEXURE L
SIDRA OUTPUT

USER REPORT FOR SITE

 Project: HON0031-R03-SIDRA

Template: Standard Site Report

Site: 1 [1A]

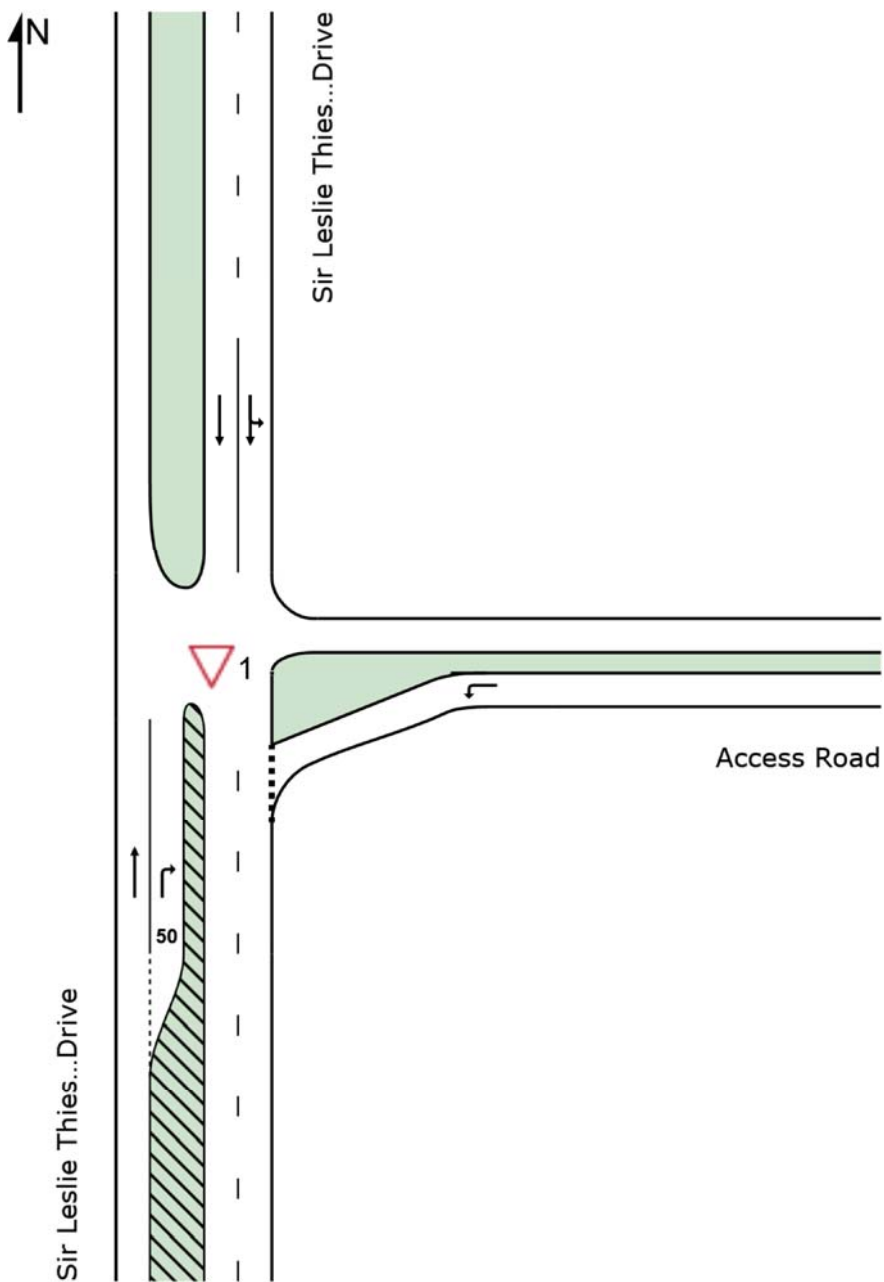
Sir Leslie Thiess Drive / access road intersection

Morning peak hour traffic

Site Category: (None)

Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Sir Leslie Thiess Drive												
2	T1	208	0.5	0.108	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	311	4.4	0.277	6.8	LOS A	1.3	9.6	0.39	0.64	0.39	31.2
Approach		519	2.8	0.277	4.1	NA	1.3	9.6	0.24	0.38	0.24	38.5
East: Access Road												
4	L2	13	0.0	0.011	3.1	LOS A	0.0	0.3	0.20	0.54	0.20	42.2
Approach		13	0.0	0.011	3.1	LOS A	0.0	0.3	0.20	0.54	0.20	42.2
North: Sir Leslie Thiess Drive												
7	L2	1	0.0	0.060	2.5	LOS A	0.0	0.0	0.00	0.00	0.00	13.3
8	T1	231	0.5	0.060	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		232	0.5	0.060	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.6
All Vehicles		763	2.1	0.277	2.8	NA	1.3	9.6	0.16	0.27	0.16	43.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
								Veh	Dist m				
South: Sir Leslie Thiess Drive													
Lane 1	208	0.5	1925	0.108	100	0.0	LOS A	0.0	0.0	Full	120	0.0	0.0
Lane 2	311	4.4	1120	0.277	100	6.8	LOS A	1.3	9.6	Short	50	0.0	NA
Approach	519	2.8		0.277		4.1	NA	1.3	9.6				
East: Access Road													
Lane 1	13	0.0	1200	0.011	100	3.1	LOS A	0.0	0.3	Full	15	0.0	0.0
Approach	13	0.0		0.011		3.1	LOS A	0.0	0.3				
North: Sir Leslie Thiess Drive													
Lane 1	116	0.5	1943	0.060	100	0.0	LOS A	0.0	0.0	Full	15	0.0	0.0
Lane 2	116	0.5	1944	0.060	100	0.0	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	232	0.5		0.060		0.0	NA	0.0	0.0				
Intersection	763	2.1		0.277		2.8	NA	1.3	9.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 1 [1P]

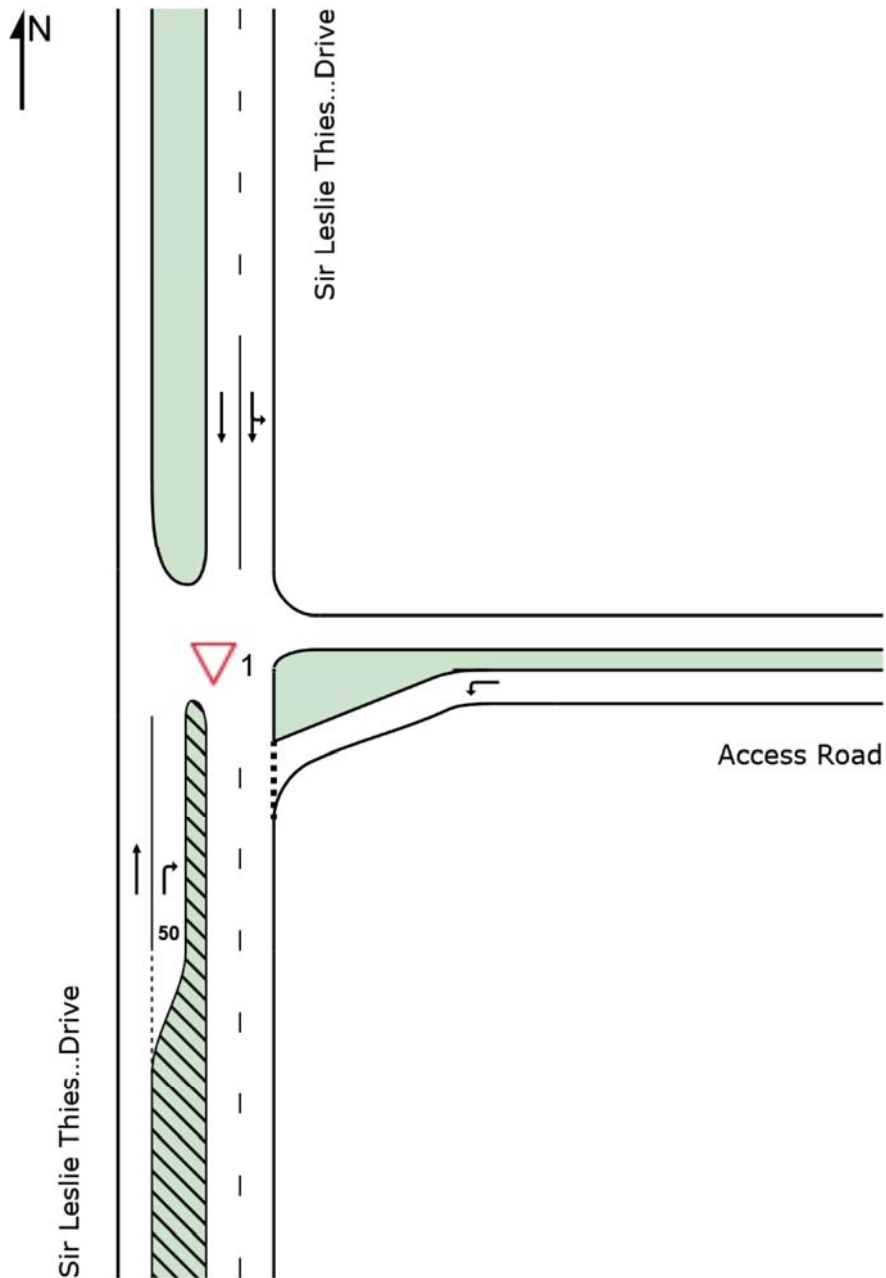
Sir Leslie Thiess Drive / access road intersection

Evening peak hour traffic

Site Category: (None)

Giveaway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Sir Leslie Thiess Drive												
2	T1	215	0.5	0.111	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	203	3.1	0.184	6.8	LOS A	0.8	5.8	0.38	0.64	0.38	31.3
Approach		418	1.8	0.184	3.3	NA	0.8	5.8	0.18	0.31	0.18	41.3
East: Access Road												
4	L2	18	0.0	0.016	3.2	LOS A	0.1	0.4	0.22	0.54	0.22	42.0
Approach		18	0.0	0.016	3.2	LOS A	0.1	0.4	0.22	0.54	0.22	42.0
North: Sir Leslie Thiess Drive												
7	L2	1	0.0	0.065	2.5	LOS A	0.0	0.0	0.00	0.00	0.00	13.3
8	T1	253	0.4	0.065	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		254	0.4	0.065	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.7
All Vehicles		689	1.2	0.184	2.1	NA	0.8	5.8	0.12	0.20	0.12	46.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
								Veh	Dist m				
South: Sir Leslie Thiess Drive													
Lane 1	215	0.5	1927	0.111	100	0.0	LOS A	0.0	0.0	Full	120	0.0	0.0
Lane 2	203	3.1	1106	0.184	100	6.8	LOS A	0.8	5.8	Short	50	0.0	NA
Approach	418	1.8		0.184		3.3	NA	0.8	5.8				
East: Access Road													
Lane 1	18	0.0	1142	0.016	100	3.2	LOS A	0.1	0.4	Full	15	0.0	0.0
Approach	18	0.0		0.016		3.2	LOS A	0.1	0.4				
North: Sir Leslie Thiess Drive													
Lane 1	127	0.4	1944	0.065	100	0.0	LOS A	0.0	0.0	Full	15	0.0	0.0
Lane 2	127	0.4	1945	0.065	100	0.0	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	254	0.4		0.065		0.0	NA	0.0	0.0				
Intersection	689	1.2		0.184		2.1	NA	0.8	5.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

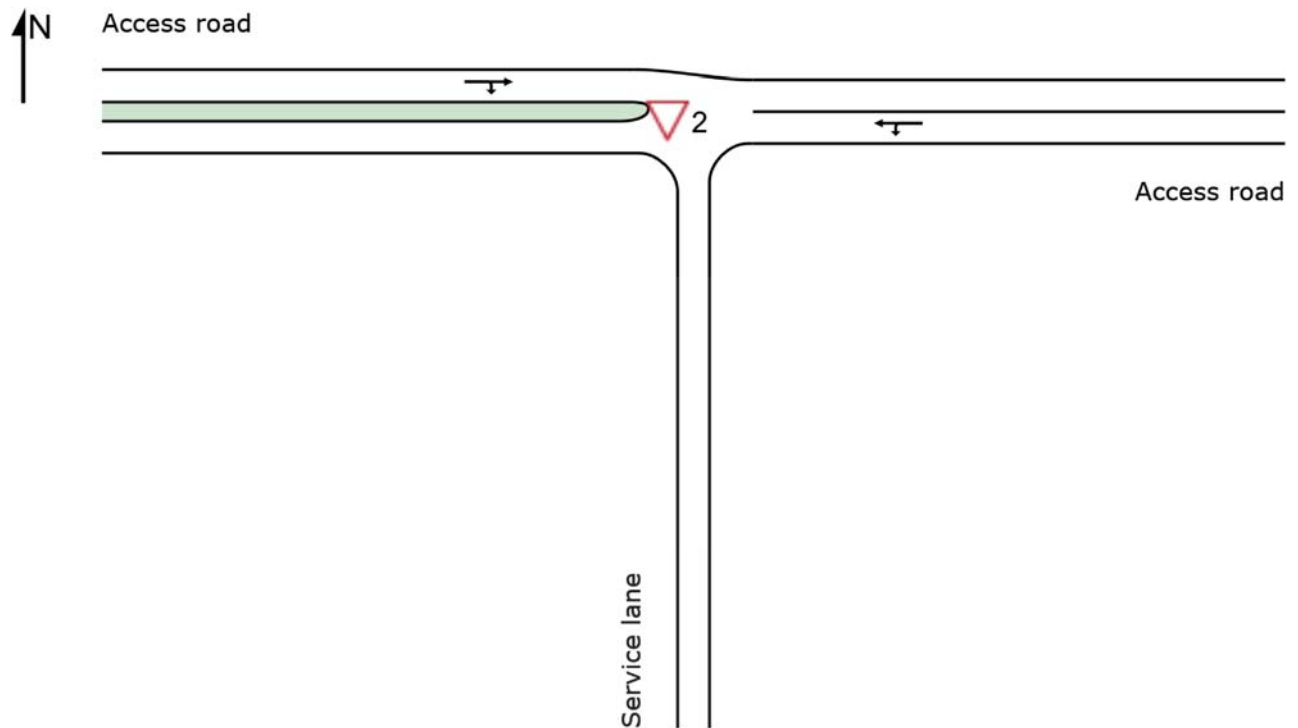
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 2 [2A]

Service lane entry
Morning peak hour traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Access road												
4	L2	1	0.0	0.007	2.5	LOS A	0.0	0.0	0.00	0.04	0.00	37.2
5	T1	13	0.0	0.007	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	55.6
Approach		14	0.0	0.007	0.2	NA	0.0	0.0	0.00	0.04	0.00	52.7
West: Access road												
11	T1	15	0.0	0.178	0.0	LOS A	0.9	6.8	0.07	0.55	0.07	30.2
12	R2	296	4.6	0.178	2.4	LOS A	0.9	6.8	0.07	0.55	0.07	25.5
Approach		311	4.4	0.178	2.3	NA	0.9	6.8	0.07	0.55	0.07	25.6
All Vehicles		324	4.2	0.178	2.2	NA	0.9	6.8	0.07	0.52	0.07	26.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
								Veh	Dist m				
East: Access road													
Lane 1	14	0.0	1943	0.007	100	0.2	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	14	0.0		0.007		0.2	NA	0.0	0.0				
West: Access road													
Lane 1	311	4.4	1742	0.178	100	2.3	LOS A	0.9	6.8	Full	15	0.0	0.0
Approach	311	4.4		0.178		2.3	NA	0.9	6.8				
Intersection	324	4.2		0.178		2.2	NA	0.9	6.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

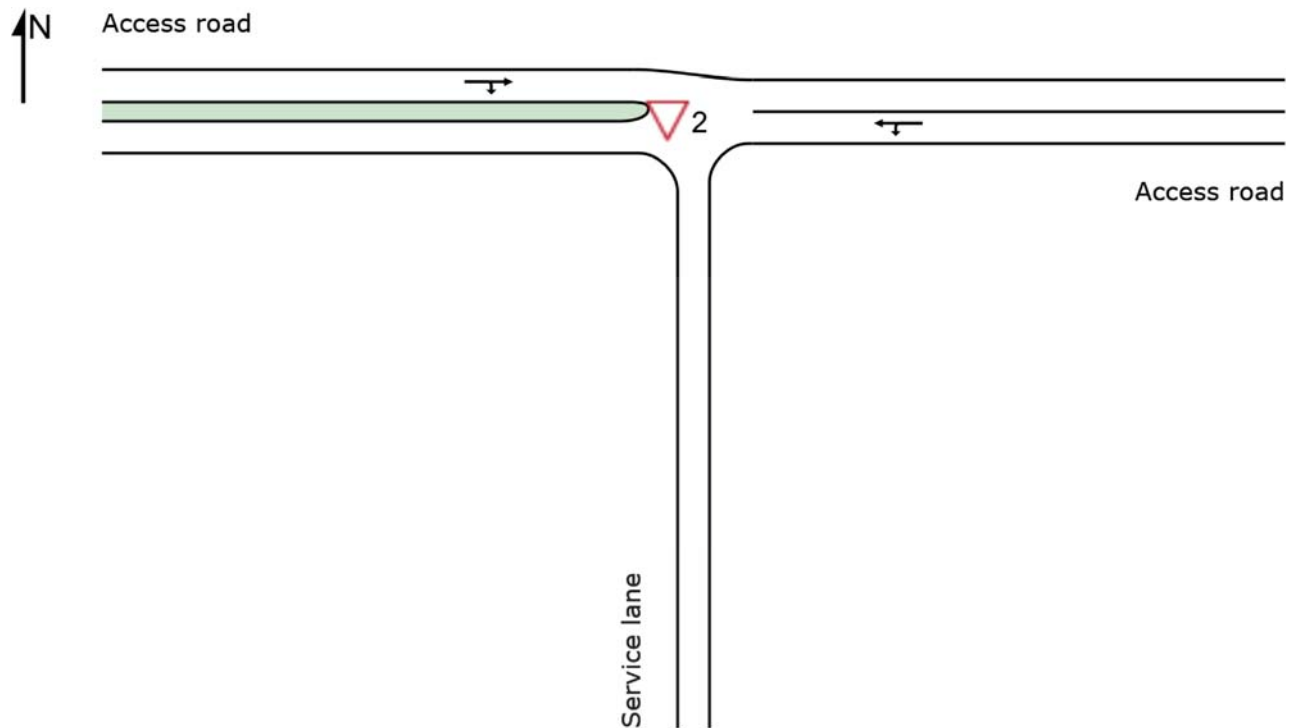
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 2 [2P]

Service lane entry
Evening peak hour traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Access road												
4	L2	21	0.0	0.021	2.5	LOS A	0.0	0.0	0.00	0.30	0.00	31.7
5	T1	18	0.0	0.021	0.0	LOS A	0.0	0.0	0.00	0.30	0.00	39.5
Approach		39	0.0	0.021	1.3	NA	0.0	0.0	0.00	0.30	0.00	34.2
West: Access road												
11	T1	37	0.0	0.118	0.1	LOS A	0.6	4.2	0.13	0.46	0.13	31.9
12	R2	166	3.8	0.118	2.5	LOS A	0.6	4.2	0.13	0.46	0.13	26.3
Approach		203	3.1	0.118	2.1	NA	0.6	4.2	0.13	0.46	0.13	26.9
All Vehicles		242	2.6	0.118	1.9	NA	0.6	4.2	0.11	0.43	0.11	27.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
								Veh	Dist m				
East: Access road													
Lane 1	39	0.0	1899	0.021	100	1.3	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	39	0.0		0.021		1.3	NA	0.0	0.0				
West: Access road													
Lane 1	203	3.1	1729	0.118	100	2.1	LOS A	0.6	4.2	Full	15	0.0	0.0
Approach	203	3.1		0.118		2.1	NA	0.6	4.2				
Intersection	242	2.6		0.118		1.9	NA	0.6	4.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

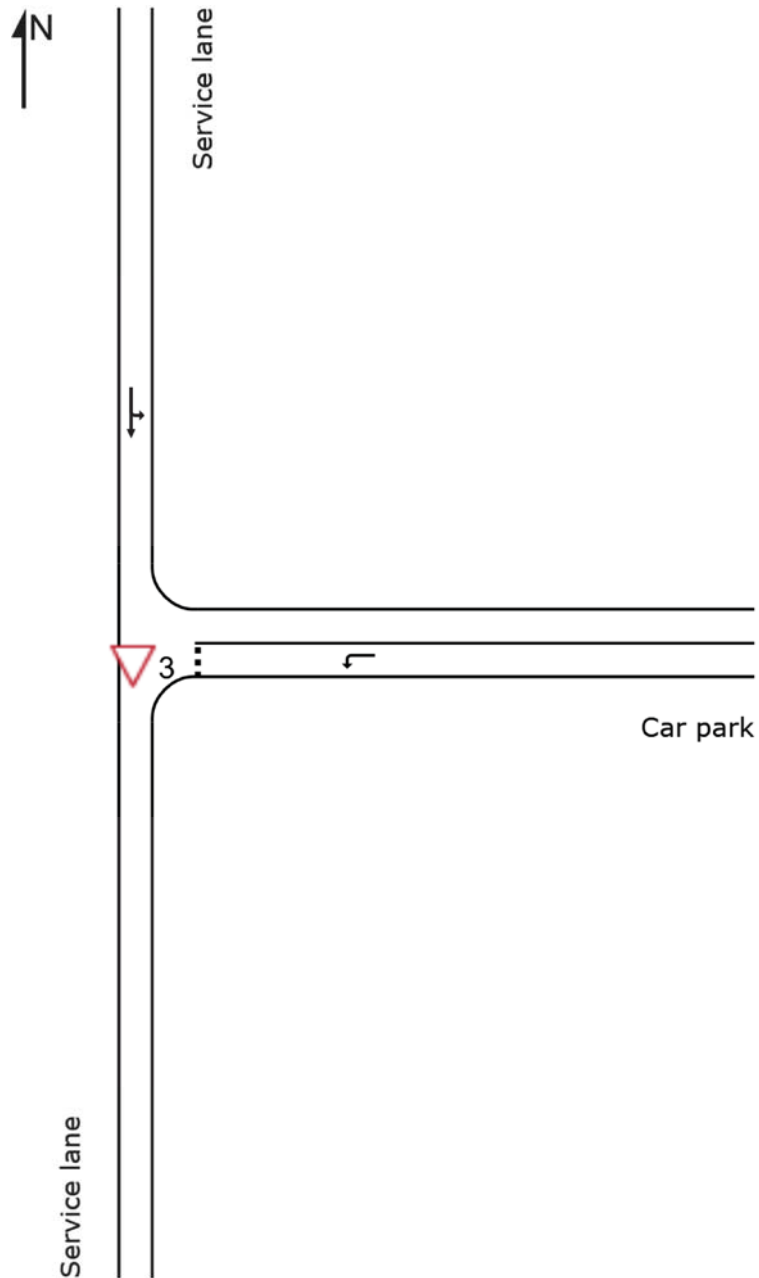
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 3 [3A]

Car park access
Morning peak hour traffic
Site Category: (None)
Giveaway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Car park												
4	L2	17	0.0	0.012	2.9	LOS A	0.0	0.3	0.24	0.52	0.24	26.5
Approach		17	0.0	0.012	2.9	LOS A	0.0	0.3	0.24	0.52	0.24	26.5
North: Service lane												
7	L2	147	0.0	0.160	3.3	LOS A	0.0	0.0	0.00	0.29	0.00	25.7
8	T1	148	9.2	0.160	0.0	LOS A	0.0	0.0	0.00	0.29	0.00	44.6
Approach		296	4.6	0.160	1.6	NA	0.0	0.0	0.00	0.29	0.00	33.9
All Vehicles		313	4.4	0.160	1.7	NA	0.0	0.3	0.01	0.30	0.01	33.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
East: Car park													
Lane 1	17	0.0	1433	0.012	100	2.9	LOS A	0.0	0.3	Full	15	0.0	0.0
Approach	17	0.0		0.012		2.9	LOS A	0.0	0.3				
North: Service lane													
Lane 1	296	4.6	1848	0.160	100	1.6	LOS A	0.0	0.0	Full	35	0.0	0.0
Approach	296	4.6		0.160		1.6	NA	0.0	0.0				
Intersection	313	4.4		0.160		1.7	NA	0.0	0.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

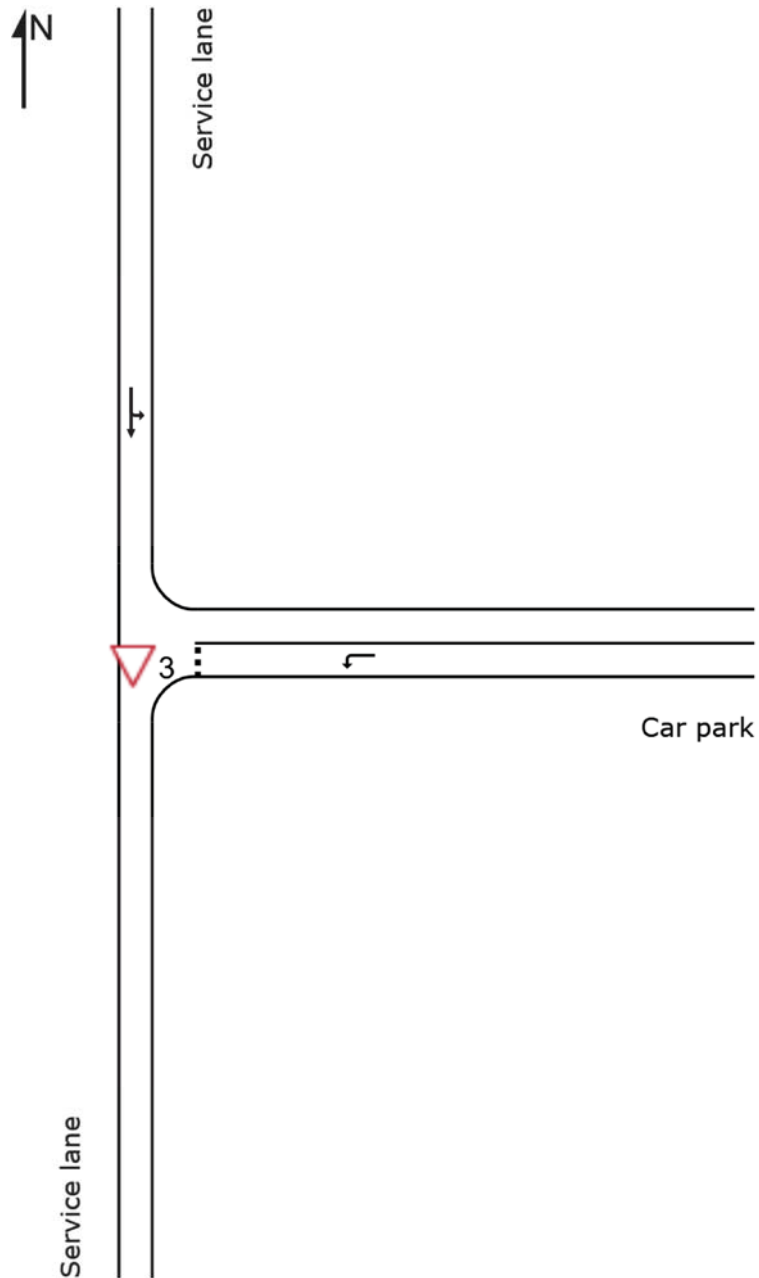
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 3 [3P]

Car park access
Evening peak hour traffic
Site Category: (None)
Giveaway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Car park												
4	L2	172	0.0	0.119	2.9	LOS A	0.5	3.5	0.25	0.54	0.25	26.4
Approach		172	0.0	0.119	2.9	LOS A	0.5	3.5	0.25	0.54	0.25	26.4
North: Service lane												
7	L2	46	0.0	0.099	3.3	LOS A	0.0	0.0	0.00	0.14	0.00	28.2
8	T1	141	4.5	0.099	0.0	LOS A	0.0	0.0	0.00	0.14	0.00	51.2
Approach		187	3.4	0.099	0.8	NA	0.0	0.0	0.00	0.14	0.00	44.0
All Vehicles		359	1.8	0.119	1.8	NA	0.5	3.5	0.12	0.33	0.12	34.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
								Veh	Dist m				
East: Car park													
Lane 1	172	0.0	1447	0.119	100	2.9	LOS A	0.5	3.5	Full	15	0.0	0.0
Approach	172	0.0		0.119		2.9	LOS A	0.5	3.5				
North: Service lane													
Lane 1	187	3.4	1885	0.099	100	0.8	LOS A	0.0	0.0	Full	35	0.0	0.0
Approach	187	3.4		0.099		0.8	NA	0.0	0.0				
Intersection	359	1.8		0.119		1.8	NA	0.5	3.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

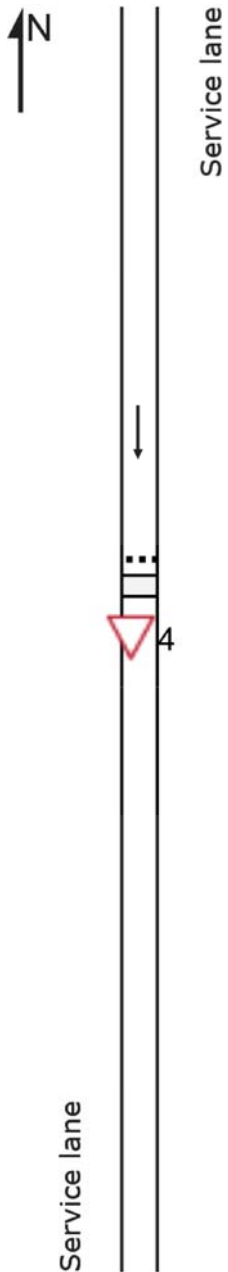
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 4 [4A]

Unsignalised pedestrian (Zebra) crossing across one-way road
Morning peak hour traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
North: Service lane												
2	T1	165	8.3	0.125	2.4	LOS A	0.5	3.5	0.19	0.48	0.19	32.2
Approach		165	8.3	0.125	2.4	LOS A	0.5	3.5	0.19	0.48	0.19	32.2
All Vehicles		165	8.3	0.125	2.4	NA	0.5	3.5	0.19	0.48	0.19	32.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
North: Service lane													
Lane 1	165	8.3	1325	0.125	100	2.4	LOS A	0.5	3.5	Full	35	0.0	0.0
Approach	165	8.3		0.125		2.4	LOS A	0.5	3.5				
Intersection	165	8.3		0.125		2.4	NA	0.5	3.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

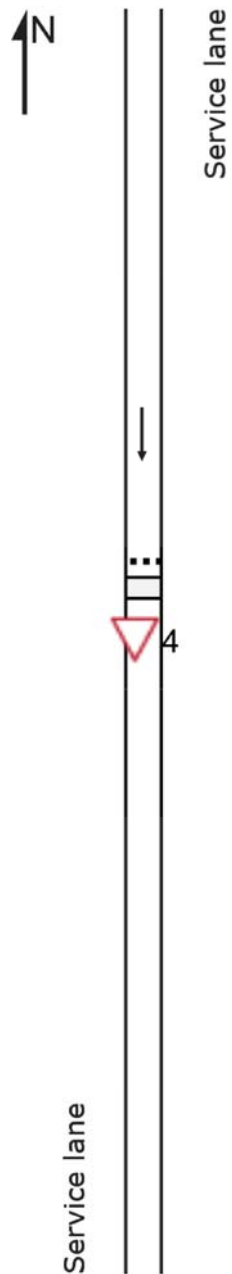
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 4 [4P]

Unsignalised pedestrian (Zebra) crossing across one-way road
Evening peak hour traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
North: Service lane												
2	T1	313	2.0	0.226	2.4	LOS A	0.9	6.7	0.19	0.48	0.19	32.3
Approach		313	2.0	0.226	2.4	LOS A	0.9	6.7	0.19	0.48	0.19	32.3
All Vehicles		313	2.0	0.226	2.4	NA	0.9	6.7	0.19	0.48	0.19	32.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
North: Service lane													
Lane 1	313	2.0	1384	0.226	100	2.4	LOS A	0.9	6.7	Full	35	0.0	0.0
Approach	313	2.0		0.226		2.4	LOS A	0.9	6.7				
Intersection	313	2.0		0.226		2.4	NA	0.9	6.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

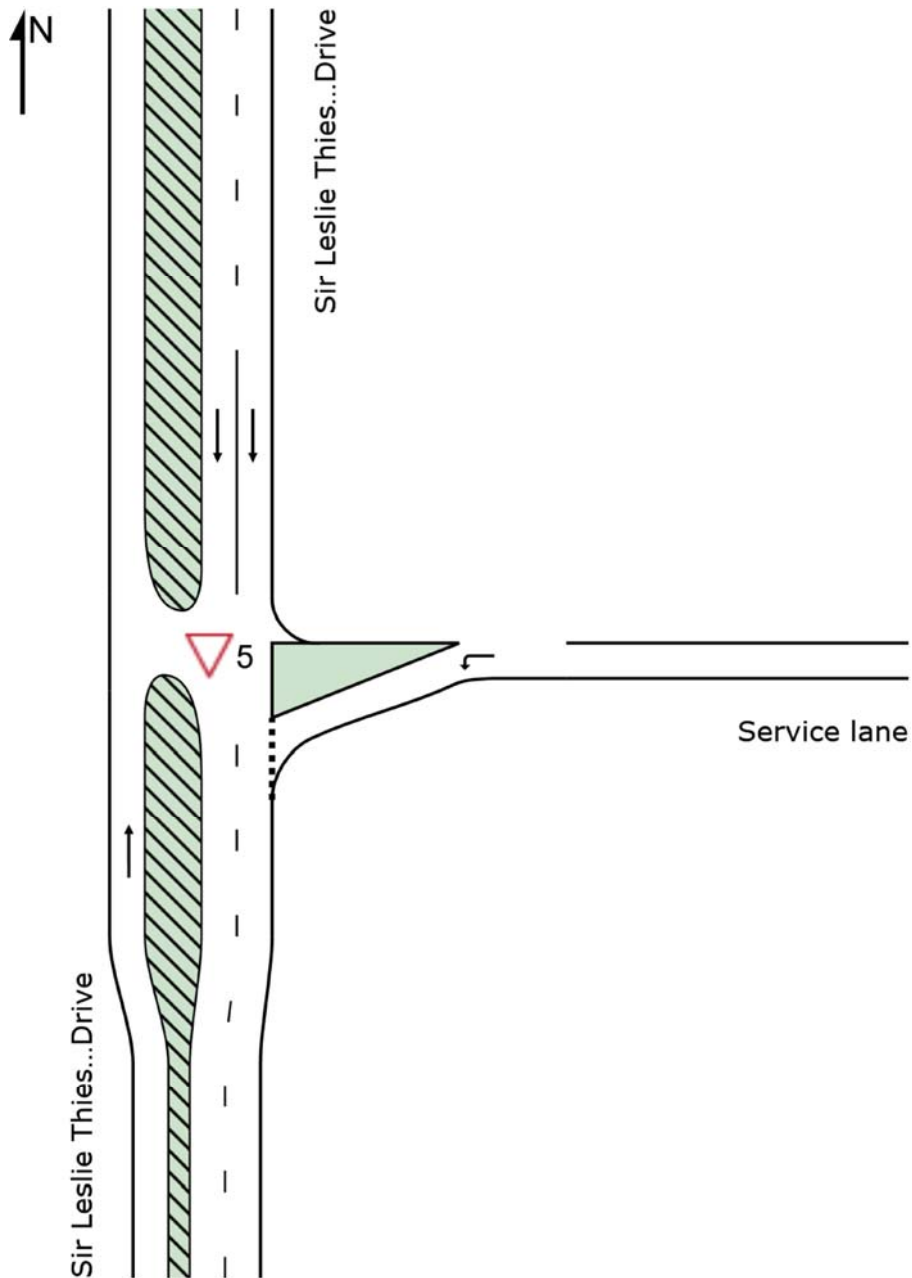
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Service lane exit
Morning peak hour traffic
Site Category: (None)
Giveaway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Sir Leslie Thiess Drive												
2	T1	519	2.8	0.271	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		519	2.8	0.271	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
East: Service lane												
4	L2	165	8.3	0.117	3.9	LOS A	0.5	3.7	0.23	0.55	0.23	27.8
Approach		165	8.3	0.117	3.9	LOS A	0.5	3.7	0.23	0.55	0.23	27.8
North: Sir Leslie Thiess Drive												
8	T1	243	0.4	0.063	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		243	0.4	0.063	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
All Vehicles		927	3.2	0.271	0.7	NA	0.5	3.7	0.04	0.10	0.04	53.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV						Veh	Dist				
	veh/h	%											
South: Sir Leslie Thiess Drive													
Lane 1	519	2.8	1915	0.271	100	0.0	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	519	2.8		0.271		0.0	NA	0.0	0.0				
East: Service lane													
Lane 1	165	8.3	1412	0.117	100	3.9	LOS A	0.5	3.7	Full	35	0.0	0.0
Approach	165	8.3		0.117		3.9	LOS A	0.5	3.7				
North: Sir Leslie Thiess Drive													
Lane 1	121	0.9	1939	0.063	100	0.0	LOS A	0.0	0.0	Full	120	0.0	0.0
Lane 2	122	0.0	1950	0.063	100	0.0	LOS A	0.0	0.0	Full	120	0.0	0.0
Approach	243	0.4		0.063		0.0	NA	0.0	0.0				
Intersection	927	3.2		0.271		0.7	NA	0.5	3.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

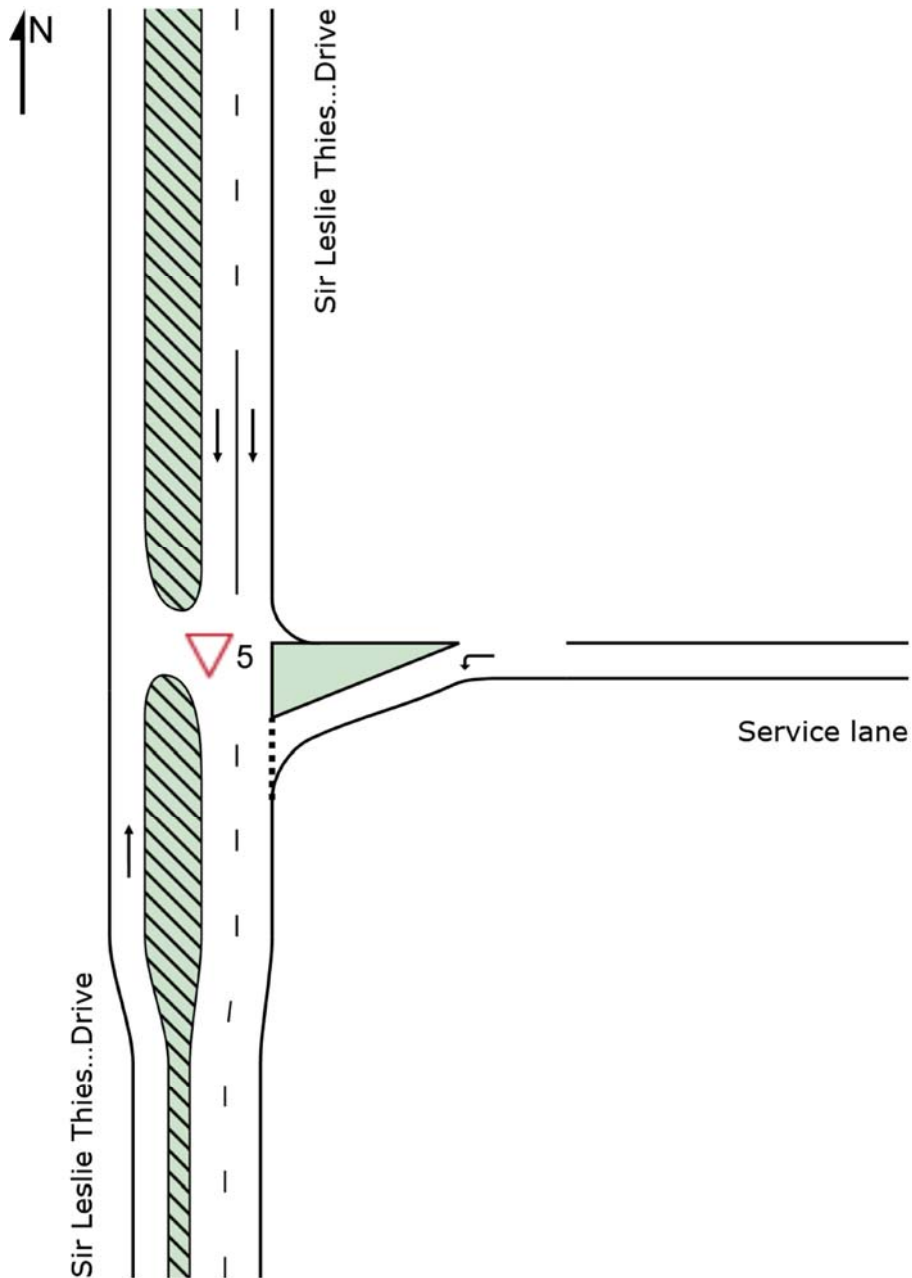
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▼ Site: 5 [5P]

Service lane exit
Evening peak hour traffic
Site Category: (None)
Giveaway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Sir Leslie Thiess Drive												
2	T1	418	1.8	0.217	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		418	1.8	0.217	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
East: Service lane												
4	L2	313	2.0	0.217	4.0	LOS A	1.0	7.2	0.26	0.56	0.26	27.6
Approach		313	2.0	0.217	4.0	LOS A	1.0	7.2	0.26	0.56	0.26	27.6
North: Sir Leslie Thiess Drive												
8	T1	271	0.4	0.070	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		271	0.4	0.070	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
All Vehicles		1001	1.5	0.217	1.3	NA	1.0	7.2	0.08	0.18	0.08	49.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV						Veh	Dist				
	veh/h	%											
South: Sir Leslie Thiess Drive													
Lane 1	418	1.8	1928	0.217	100	0.0	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	418	1.8		0.217		0.0	NA	0.0	0.0				
East: Service lane													
Lane 1	313	2.0	1442	0.217	100	4.0	LOS A	1.0	7.2	Full	35	0.0	0.0
Approach	313	2.0		0.217		4.0	LOS A	1.0	7.2				
North: Sir Leslie Thiess Drive													
Lane 1	135	0.8	1940	0.070	100	0.0	LOS A	0.0	0.0	Full	120	0.0	0.0
Lane 2	136	0.0	1950	0.070	100	0.0	LOS A	0.0	0.0	Full	120	0.0	0.0
Approach	271	0.4		0.070		0.0	NA	0.0	0.0				
Intersection	1001	1.5		0.217		1.3	NA	1.0	7.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

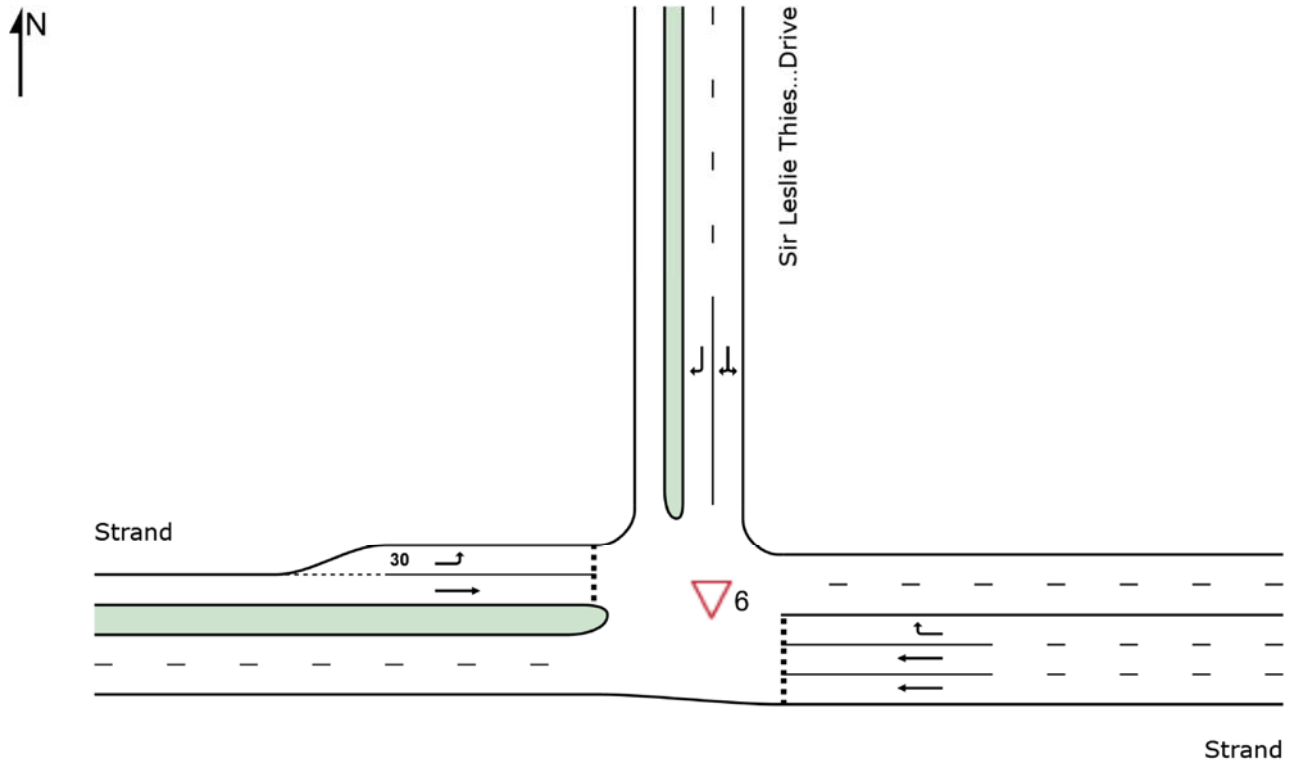
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

 Site: 6 [6A]

Strand / Sir Leslie Thiess Drive intersection
Morning peak hour traffic
Site Category: (None)
Giveaway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Strand												
5	T1	7	0.0	0.004	2.9	LOS A	0.0	0.1	0.39	0.48	0.39	29.6
6	R2	1	0.0	0.002	8.2	LOS A	0.0	0.1	0.64	0.66	0.64	13.5
Approach		8	0.0	0.004	3.6	LOS A	0.0	0.1	0.42	0.50	0.42	27.2
North: Sir Leslie Thiess Drive												
7	L2	1	0.0	0.113	2.5	LOS A	0.0	0.0	0.00	0.51	0.00	25.2
9	R2	408	3.6	0.113	2.4	LOS A	0.0	0.0	0.00	0.51	0.00	29.4
Approach		409	3.6	0.113	2.4	NA	0.0	0.0	0.00	0.51	0.00	29.4
West: Strand												
10	L2	519	2.8	0.285	3.9	LOS A	0.0	0.0	0.00	0.55	0.00	29.1
11	T1	7	0.0	0.007	4.2	LOS A	0.0	0.2	0.39	0.53	0.39	28.6
Approach		526	2.8	0.285	3.9	LOS A	0.0	0.2	0.01	0.55	0.01	29.1
All Vehicles		944	3.1	0.285	3.2	NA	0.0	0.2	0.01	0.53	0.01	29.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV						Veh	Dist				
	veh/h	%	veh/h	v/c	%	sec					m	%	%
East: Strand													
Lane 1	4	0.0	1050	0.004	100	2.9	LOS A	0.0	0.1	Full	15	0.0	0.0
Lane 2	4	0.0	1050	0.004	100	2.9	LOS A	0.0	0.1	Full	15	0.0	0.0
Lane 3	1	0.0	444	0.002	100	8.2	LOS A	0.0	0.1	Full	15	0.0	0.0
Approach	8	0.0		0.004		3.6	LOS A	0.0	0.1				
North: Sir Leslie Thiess Drive													
Lane 1	205	3.6	1811	0.113	100	2.4	LOS A	0.0	0.0	Full	15	0.0	0.0
Lane 2	205	3.6	1811	0.113	100	2.4	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	409	3.6		0.113		2.4	NA	0.0	0.0				
West: Strand													
Lane 1	519	2.8	1820	0.285	100	3.9	LOS A	0.0	0.0	Short	30	0.0	NA
Lane 2	7	0.0	1046	0.007	100	4.2	LOS A	0.0	0.2	Full	50	0.0	0.0
Approach	526	2.8		0.285		3.9	LOS A	0.0	0.2				
Intersection	944	3.1		0.285		3.2	NA	0.0	0.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

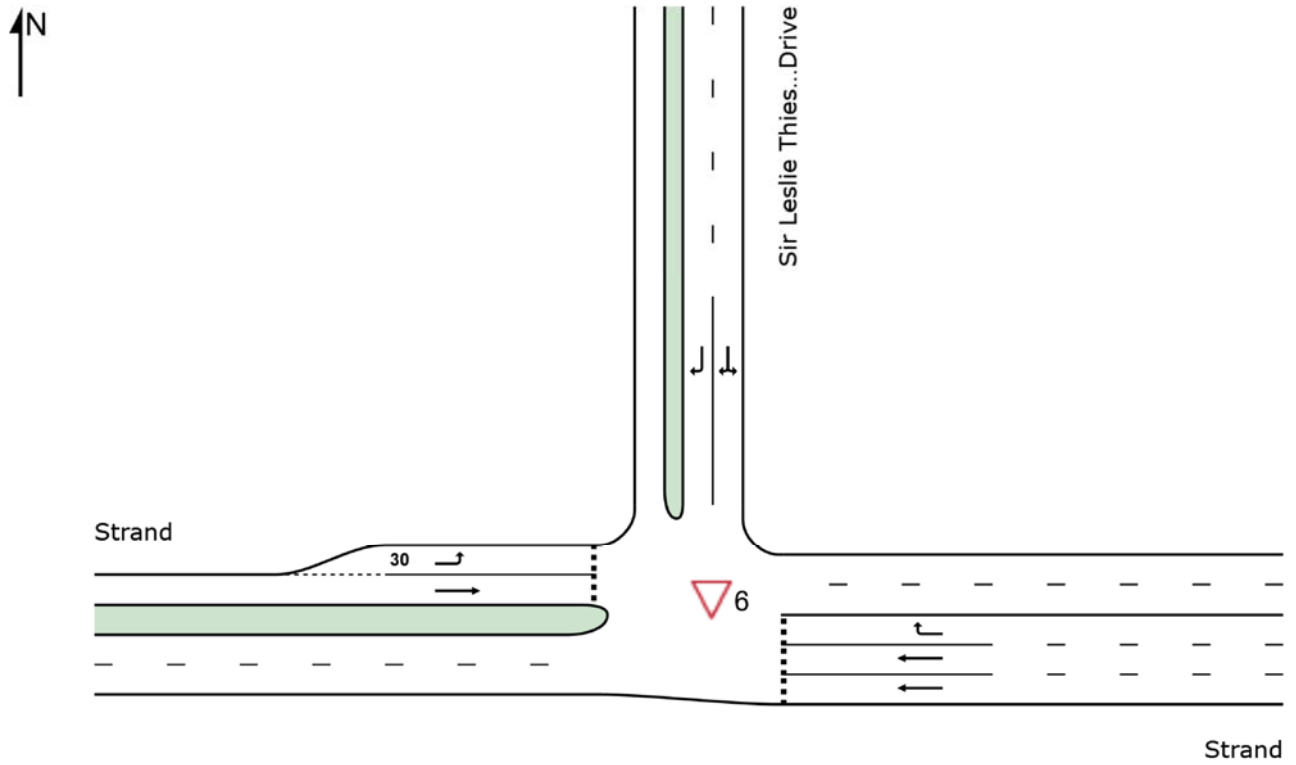
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

 Site: 6 [6P]

Strand / Sir Leslie Thiess Drive intersection
Evening peak hour traffic
Site Category: (None)
Giveaway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Strand												
5	T1	7	0.0	0.004	3.7	LOS A	0.0	0.1	0.46	0.53	0.46	27.5
6	R2	1	0.0	0.002	8.6	LOS A	0.0	0.1	0.66	0.67	0.66	13.1
Approach		8	0.0	0.004	4.3	LOS A	0.0	0.1	0.49	0.54	0.49	25.3
North: Sir Leslie Thiess Drive												
7	L2	1	0.0	0.159	2.5	LOS A	0.0	0.0	0.00	0.51	0.00	25.2
9	R2	583	1.3	0.159	2.4	LOS A	0.0	0.0	0.00	0.51	0.00	29.4
Approach		584	1.3	0.159	2.4	NA	0.0	0.0	0.00	0.51	0.00	29.4
West: Strand												
10	L2	418	1.8	0.228	3.9	LOS A	0.0	0.0	0.00	0.55	0.00	29.1
11	T1	7	0.0	0.008	5.0	LOS A	0.0	0.2	0.47	0.58	0.47	26.6
Approach		425	1.7	0.228	3.9	LOS A	0.0	0.2	0.01	0.55	0.01	29.1
All Vehicles		1018	1.4	0.228	3.0	NA	0.0	0.2	0.01	0.53	0.01	29.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV						Veh	Dist				
	veh/h	%	veh/h	v/c	%	sec					m	%	%
East: Strand													
Lane 1	4	0.0	887	0.004	100	3.7	LOS A	0.0	0.1	Full	15	0.0	0.0
Lane 2	4	0.0	887	0.004	100	3.7	LOS A	0.0	0.1	Full	15	0.0	0.0
Lane 3	1	0.0	423	0.002	100	8.6	LOS A	0.0	0.1	Full	15	0.0	0.0
Approach	8	0.0		0.004		4.3	LOS A	0.0	0.1				
North: Sir Leslie Thiess Drive													
Lane 1	292	1.3	1840	0.159	100	2.4	LOS A	0.0	0.0	Full	15	0.0	0.0
Lane 2	292	1.3	1840	0.159	100	2.4	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	584	1.3		0.159		2.4	NA	0.0	0.0				
West: Strand													
Lane 1	418	1.8	1834	0.228	100	3.9	LOS A	0.0	0.0	Short	30	0.0	NA
Lane 2	7	0.0	883	0.008	100	5.0	LOS A	0.0	0.2	Full	50	0.0	0.0
Approach	425	1.7		0.228		3.9	LOS A	0.0	0.2				
Intersection	1018	1.4		0.228		3.0	NA	0.0	0.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK

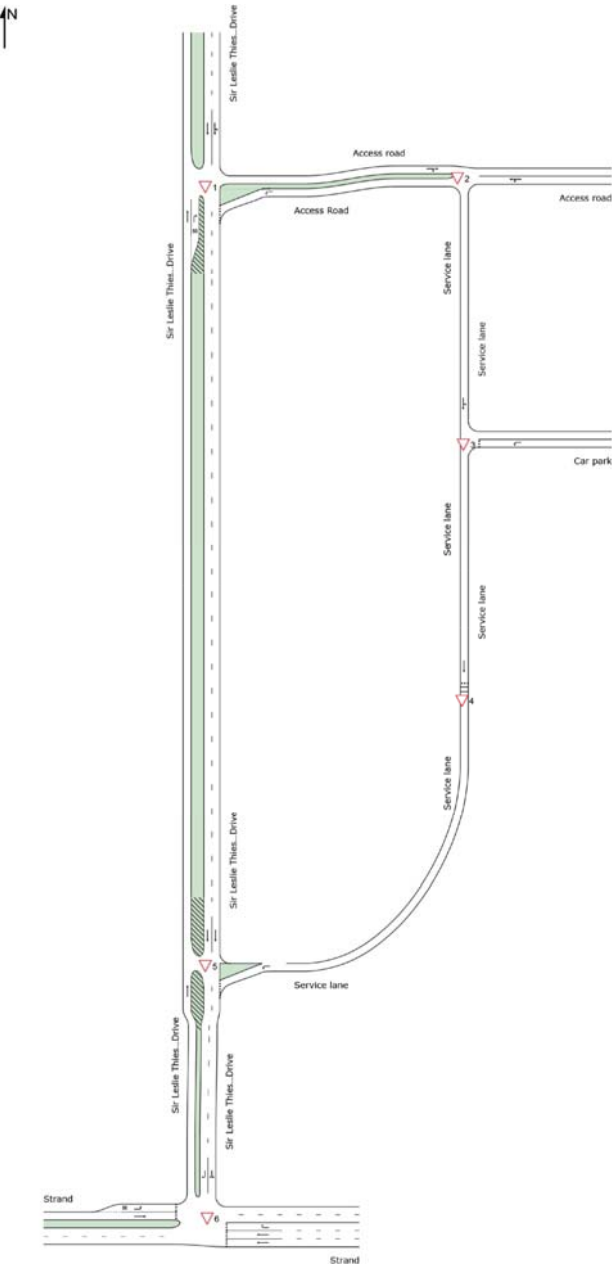
 Project: HON0031-R03-SIDRA

Template: Standard Network
Report

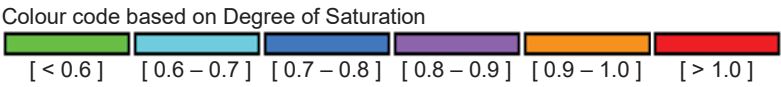
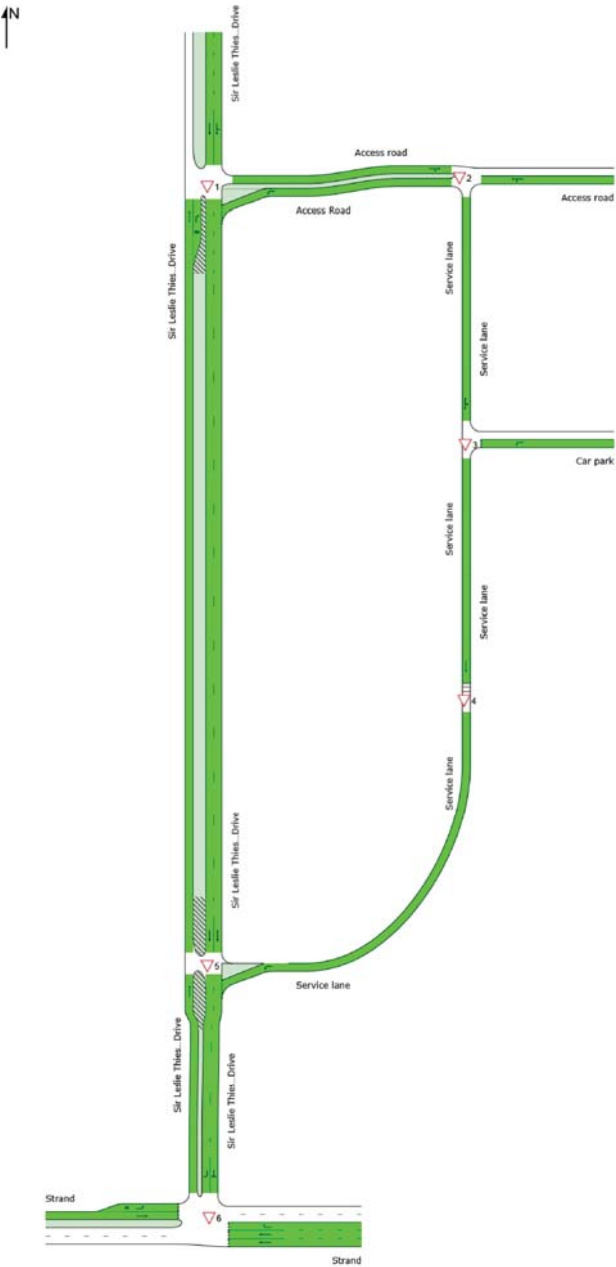
Network: N1 [A]

Townsville Marine Tourism Precinct
Morning peak hour traffic
Network Category: (None)

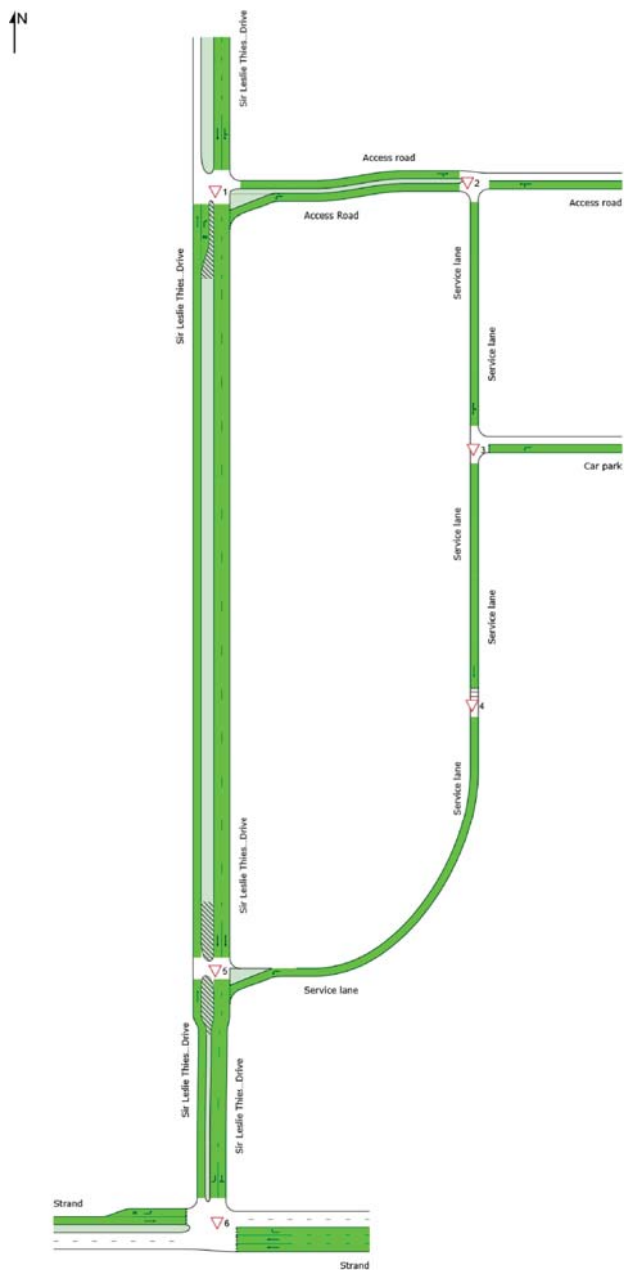
Network Layout



Degree of Saturation



Lane Level of Service



Colour code based on Level of Service

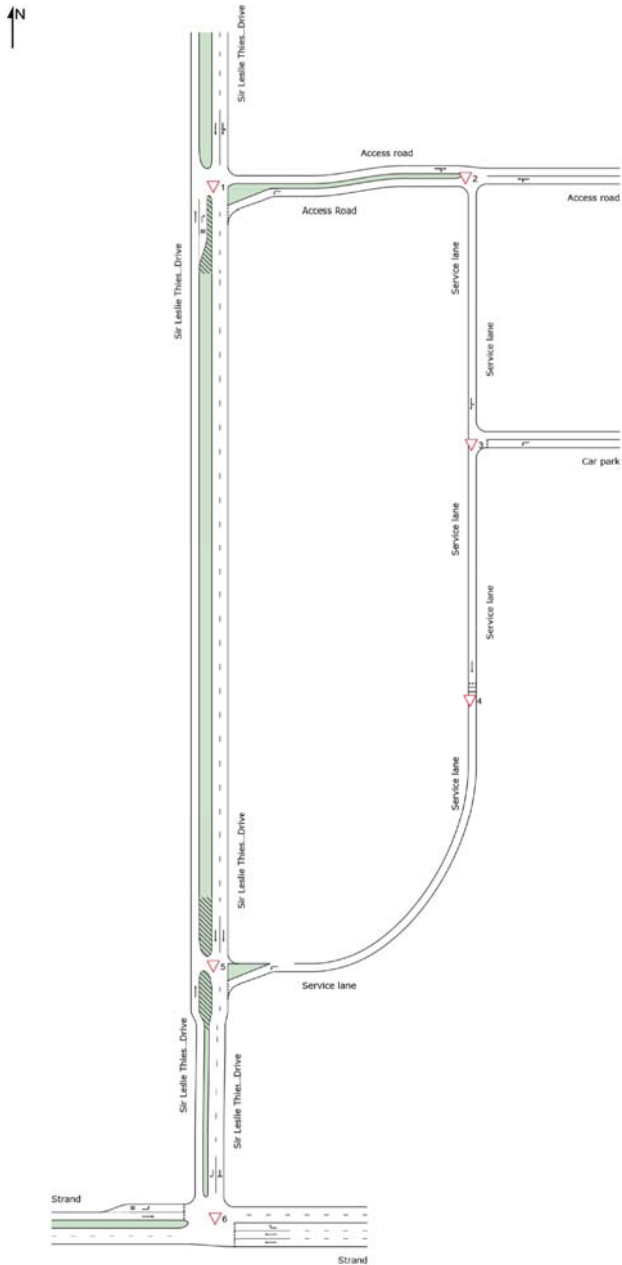


Delay model settings are specified for individual Sites forming the Network.

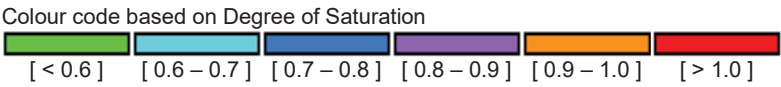
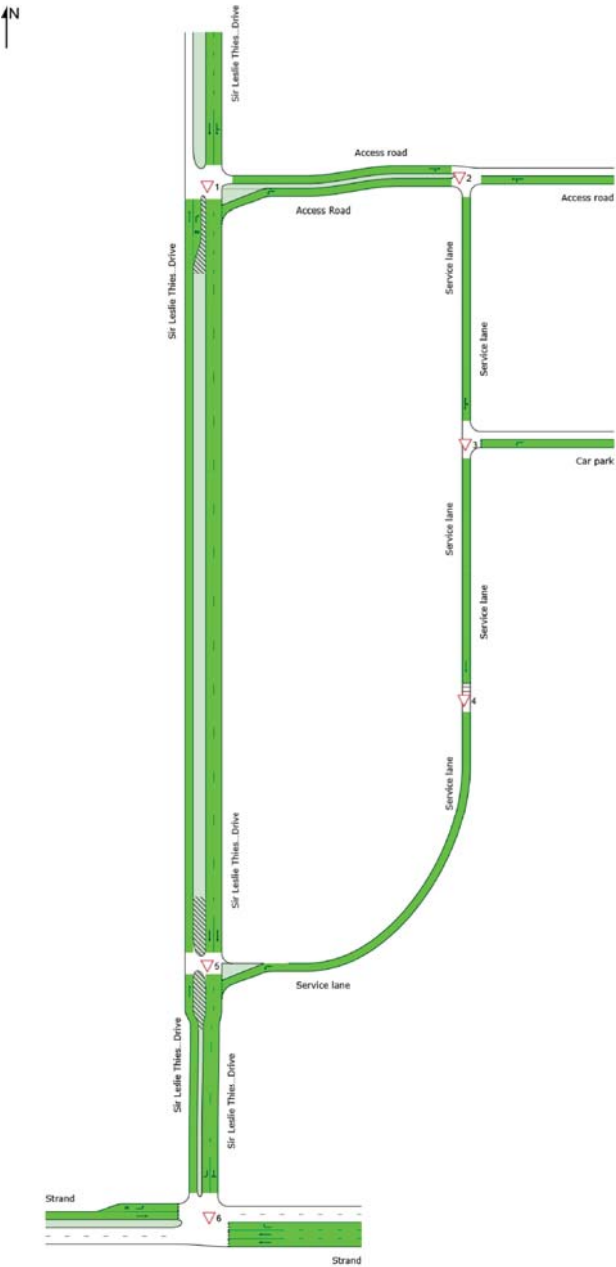
Network: N1 [P]

Townsville Marine Tourism Precinct
Evening peak hour traffic
Network Category: (None)

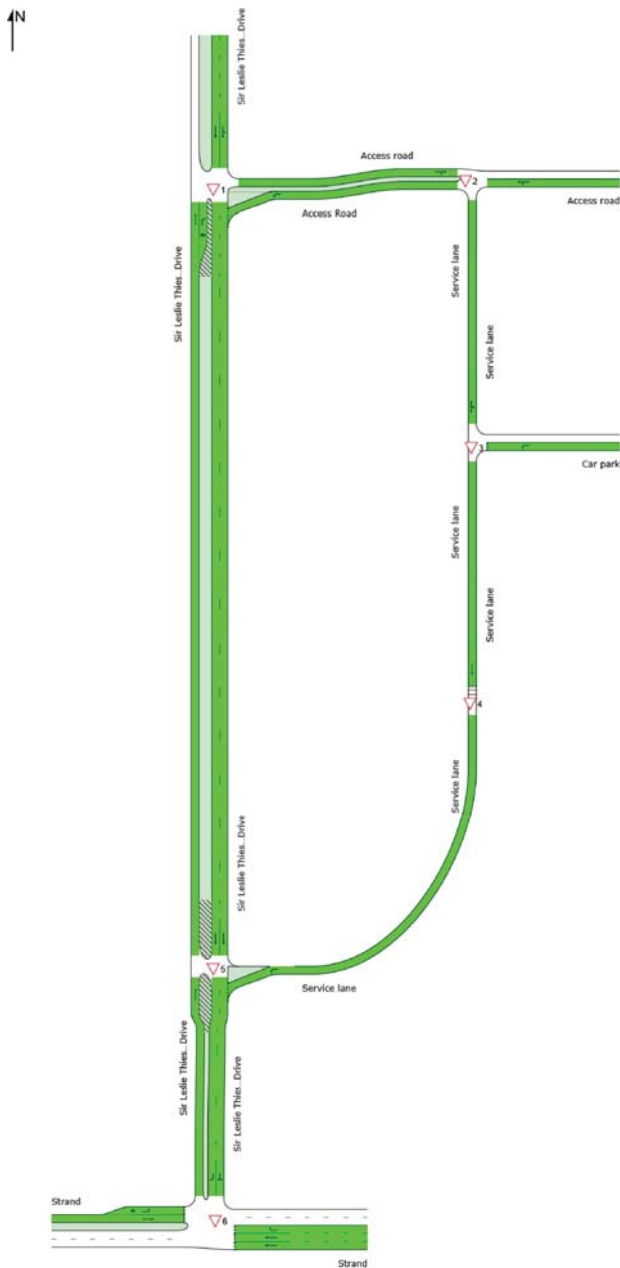
Network Layout



Degree of Saturation



Lane Level of Service



Colour code based on Level of Service



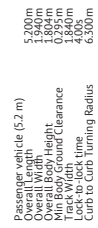
Delay model settings are specified for individual Sites forming the Network.

ANNEXURE M
SWEPT PATH ANALYSIS



JOB CODE	HON-0031
SHEET NUMBER	SKC018
REV	1

REVIEWS



WHEEL PATH

VEHICLE PATH OUTLINE

HONEYCOMBS PROPERTY GROUP
TOWNSVILLE MARINE TOURISM PRECINCT
CORNER OF THE STRAND AND SIR LESLIE THIESS DRIVE, TOWNSVILLE
MEZZANINE LEVEL - B99 CAR

JOB CODE	HON-0031	
SHEET NUMBER	SKC021	REV 1

ANNEXURE N
SIR LESLIE THIESS DRIVE SOUTHERN CROSSING APCFST
ASSESSMENT



Choose File

No file chosen

Load a CSV File

OR fill in the form below

File loaded

Townsville Marine Tourism Precinct_2_10_07_2019.csv was loaded successfully.

HELP

PRINT

Project details

Project name:

Townsville Marine Tourism Precinct

Project location:

Sir Leslie Thiess Drive south

Option/assessment number:

2

Date of assessment:

03-09-2019

Site information

Jurisdiction:

Queensland

Midblock or intersection?

Midblock

Existing facility:

No facility

Crash information

Use crash model or crash history?

Model

Wombat crossings

The tool can be used to assess Wombat crossings. A Wombat crossing is functionally similar to a "Zebra with platform" or "Zebra with platform and kerb extensions" (if the crossing includes kerb extensions). To assess a Wombat crossing please select the appropriate crossing type in the Feasible facilities table and continue with the assessment as normal.

Physical/environmental/Operational variables

Number of traffic directions:

Two

Centre treatment:

Raised median

Median width:

1 metres

Median acts as refuge:

No

Parking/shoulder:

No

Pedestrian visibility:

50 metres

Posted speed limit:

50 km/h

Direction 1

Flow:

Left to Right

Flow type:

Uninterrupted

Peak vehicle volume:

493 veh/hr

Traffic lanes:

1

Crossing distance:

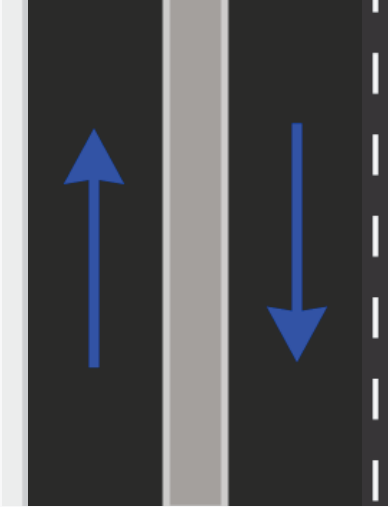
7 metres

Direction 2

Flow:

Right to Left

Layout diagram



austpedtool.com/index.html

1/6

percentile):
60 km/h

▼

Traffic volume (AADT):
9959 veh/day

?

Peak sensitive pedestrian volume:
0 ped/hr

?

Peak non-sensitive pedestrian volume:
64 ped/hr

?

Estimated daily pedestrian volume:
640 ped/day

?

Average vehicle occupancy:
1.3 pers/veh

?

Flow type:
Uninterrupted

▼

?

Peak vehicle volume:
257 veh/hr

?

Traffic lanes:
2

▼

?

Crossing distance:
7 metres

?

Site characteristics

Exposed crossing distance:
7 + 1 + 7 = 15 metres

Est. pedestrian crossing time (exposed): 12.5 seconds

Total peak hourly vehicle flow:
493 + 257 = 750 veh/hr



Model parameters

Show/Hide

Walk speed of average sensitive pedestrians:
1 m/s

Walk speed of average non-sensitive pedestrians:
1.2 m/s

Average cost of pedestrian crashes:
\$ 23015

Value of delay:
\$ 29.77 /hr

Pedestrian conversion factor:
0.6

Vehicle conversion factor:
0.4

Economic assessment parameters

Economic update factors

Evaluation days per annum:
250

Project lifetime:
30 years

Discount rate:
7 %

Base date
June 2010

Update factor to current date
1

Travel time costs/savings

Vehicle operating costs/savings
June 2010

Crash costs/savings
June 2010

Expected crash reduction factors

Platform	Kerb extensions	Median refuge	Kerb extensions with median refuge	Zebra only	Zebra with platform	Zebra with kerb extensions	Zebra with platform and kerb extensions	Zebra with median refuge	Zebra with kerb extensions and median refuge	Signals	Signals with kerb extensions	Grade separation
47 %	35 %	56 %	56 %	0 %	63 %	35 %	63 %	56 %	56 %	45 %	45 %	86 %

Calculate feasibility

[View the facility feasibility process \(PDF\) here](#)

☐ Automatically calculate when inputs are updated? [?](#)

Feasible facilities

	Suitable for site?	Built parameters	Construction cost	Annual maintenance cost	Show in final output? Select all/none/feasible
No facility	N/a	No parameters	\$	\$ 0	☒
Platform	No Too many lanes Not appropriate without formal median refuge	Vehicle negotiation speed: Please select	\$	\$	☐
Kerb extensions	No Not appropriate without formal median refuge	Total crossing distance: metres	\$	\$	☐
Median refuge	Yes	Direction 1 crossing distance: 6 metres Median refuge width: 2 metres Direction 2 crossing distance: 7 metres	\$ 0	\$ 0	☒
Kerb extensions with median refuge	Yes	Direction 1 crossing distance: 3.5 metres Median refuge width: 2 metres Direction 2 crossing distance: 7 metres	\$ 0	\$ 0	☒
Zebra only	No Too many lanes Not appropriate without formal median refuge	No parameters	\$	\$	☐
Zebra with platform	No Zebra not suitable Platform not suitable	Applies vehicle negotiation speed from Platform above	\$	\$	☐
Zebra with kerb extensions	No Zebra not suitable Kerb extensions not suitable	Applies total crossing distance from Kerb extensions above	\$	\$	☐

Zebra with platform and kerb extensions ?	No Zebra not suitable Platform not suitable Kerb extensions not suitable	Applies vehicle negotiation speed from Platform and total crossing distance from Kerb extensions above	\$	\$	\$	
Zebra with median refuge	No Zebra not suitable	Applies distances and refuge width from Median refuge above	\$	\$	\$	
Zebra with kerb extensions and median refuge	No Zebra not suitable	Applies distances and refuge width from Kerb extensions with median refuge above	\$	\$	\$	
Signals	Yes	Signals activated by pedestrian call button? Yes Delay before green pedestrian phase: 20 seconds Pedestrian walk + clearance time: 30 seconds Pedestrian platform size: 2 peds	\$	\$	\$	
Signals with kerb extensions	Yes	Applies parameters from Signals above, plus: Direction 1 crossing distance: 3.5 metres Median width: 2 metres Direction 2 crossing distance: 7 metres	\$	\$	\$	
Grade separation	Maybe Max. of approach/posted speed < 75km/h	No parameters	\$	\$	\$	

Calculate assessment

Facility assessment

	Suitable for site?	Pedestrian delay	Vehicle delay ?	Predicted crash rate ?	CSD ?	ASD ?	SISD ?
No facility *	N/a	70 sec	0 sec	0.05 /year	250 m	64 m	114 m
Median refuge	Yes	5 sec	0 sec	0.02 /year	117 m	64 m	114 m

Kerb extensions with median refuge	Yes	3 sec	0 sec	0.02 /year	117 m	64 m	114 m					
Signals	Yes	20 sec	5 sec	0.03 /year	250 m	64 m	114 m					
Signals with kerb extensions	Yes	20 sec	5 sec	0.03 /year	117 m	64 m	114 m					
Grade separation	Maybe	0 sec	0 sec	0.01 /year								
	Perceived delay ?	Perceived safety ?	Pedestrian LOS ?	Pedestrian delay cost ?	Pedestrian delay saving ?	Vehicle delay cost ?	Vehicle delay saving ?	Crash cost ?	Safety saving ?	Total benefits ?	BCR ?	
No facility *	F	F	F	\$ 718,000		\$ 0		\$ 145,000				
Median refuge	B	D	D	\$ 52,000	\$ 665,000	\$ 0	\$ 0	\$ 64,000	\$ 81,000	\$ 747,000	Zero construction cost	
Kerb extensions with median refuge	B	C	C	\$ 29,000	\$ 689,000	\$ 0	\$ 0	\$ 64,000	\$ 81,000	\$ 770,000	Zero construction cost	
Signals	C	B	B	\$ 204,000	\$ 514,000	\$ 706,000	- \$ 706,000	\$ 80,000	\$ 65,000	- \$ 127,000	Zero construction cost	
Signals with kerb extensions	C	B	B	\$ 204,000	\$ 514,000	\$ 706,000	- \$ 706,000	\$ 80,000	\$ 65,000	- \$ 127,000	Zero construction cost	
Grade separation			A	\$ 0	\$ 718,000	\$ 0	\$ 0	\$ 20,000	\$ 125,000	\$ 843,000	Zero construction cost	

Notes

A median refuge (without kerb extensions) will have the lowest construction costs and is therefore expected to result in the greatest BCR

File saved

Townsville Marine Tourism Precinct_2_03-09-2019.csv has been saved to your default download directory.

 **Reset all Fields**

Townsville Marine Tourism Precinct_2_03-09-21.csv

 **Export CSV File**

 **Back to top**

Disclaimer

The Australasian Pedestrian Crossing Facility Selection Web Tool ("the tool") is freely provided by [Austroads](#) and is intended to help practitioners select an appropriate pedestrian crossing facility for a particular location. The tool is based on literature, and analytical and behavioural research coupled with a number of mathematical models. Its development is detailed in the Austroads report [Development of the Pedestrian Facility Selection Tool \(PDF\)](#).

As with all mathematical models care must be taken to understand input limitations and background assumptions when interpreting the outputs. The tool does not replace professional engineering or planning advice and Austroads does not accept any responsibility regarding the tool. While we have endeavoured to ensure the information output by the tool is appropriate, we make no representations or warranties of any kind about the completeness, accuracy, reliability, suitability or availability with respect to the outputs. Any reliance you place on such information is strictly at your own risk and it is your responsibility to check all information output by the tool.

The tool should not be used to inform decision making in isolation when considering the form and location of pedestrian crossing facilities. Engineering judgement is required to consider the economic and other outputs produced by the tool alongside safety, mobility, social and environmental factors that are considered appropriate by the practitioner.

Version: [2.1.4](#)

ANNEXURE O
SERVICE LANE CROSSING APCFST ASSESSMENT



Australasian Pedestrian Crossing Facility Selection Tool [V2.1.4]



HELP

Choose File No file chosen

Load a CSV File

OR fill in the form below

File loaded

Townsville Marine Tourism Precinct_1.1_16_07_2019.csv was loaded successfully.

Project details

Project name: Townsville Marine Tourism Precinct

Project location: service lane

Option/assessment number: 1.1

Date of assessment: 03-09-2019

Site information

Jurisdiction: Queensland

Midblock or intersection? Midblock

Existing facility: Zebra with platform

Crash information

Use crash model or crash history?

Model

Wombat crossings

The tool can be used to assess Wombat crossings. A Wombat crossing is functionally similar to a "Zebra with platform" or "Zebra with platform and kerb extensions" (if the crossing includes kerb extensions). To assess a Wombat crossing please select the appropriate crossing type in the Feasible facilities table and continue with the assessment as normal.

Physical/environmental/Operational variables

Number of traffic directions: One

Parking/shoulder: Yes

Pedestrian visibility: 30 metres

Posted speed limit: 30 km/h

Approach speed (85th percentile): 30 km/h

Traffic volume (AADT): 2270 veh/day

Peak sensitive pedestrian volume: 0 ped/hr

Peak non-sensitive

Direction 1

Flow: Left to Right

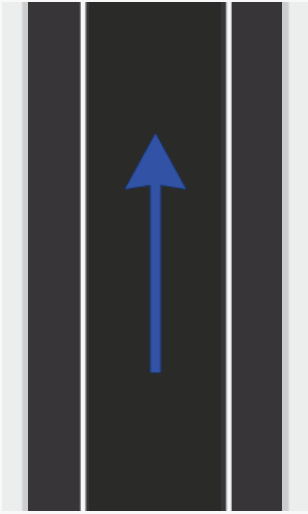
Flow type: Uninterrupted

Peak vehicle volume: 297 veh/hr

Traffic lanes: 1

Crossing distance: 9.5 metres

Layout diagram



Site characteristics

pedestrian volume:	145	ped/hr	Exposed crossing distance:	9.5 metres
Estimated daily pedestrian volume:	1355	ped/day	Est. pedestrian crossing time (exposed):	7.9 seconds
Average vehicle occupancy:	1.3	pers/veh	Total peak hourly vehicle flow:	297 veh/hr

Model parameters

[Show/Hide](#)

Walk speed of average sensitive pedestrians:

1

m/s

Walk speed of average non-sensitive pedestrians:

1.2

m/s

Average cost of pedestrian crashes:

\$ 230156

Value of delay:

\$ 29.77

/hr

Pedestrian conversion factor:

0.6

Vehicle conversion factor:

0.4

Economic assessment parameters

Evaluation days per annum:

250

Project lifetime:

30

years

Discount rate:

7

%

Economic update factors

Base date

June 2010

Update factor to current date

1

Travel time costs/savings

June 2010

1

Vehicle operating costs/savings

June 2010

1

Crash costs/savings

June 2010

1

Expected crash reduction factors

Platform	Kerb extensions	Median refuge	Kerb extensions with median refuge	Zebra only	Zebra with platform	Zebra with kerb extensions	Zebra with platform and kerb extensions	Zebra with median refuge	Zebra with kerb extensions and median refuge	Signals	Signals with kerb extensions	Grade separation
47 %	35 %	56 %	56 %	0 %	63 %	35 %	63 %	56 %	56 %	45 %	45 %	86 %

Calculate feasibility

[View the facility feasibility process \(PDF\) here](#)

☐ Automatically calculate when inputs are updated?

Feasible facilities

Suitable for site?	Built parameters	Construction cost	Annual maintenance cost	Show in final output? Select all/none/feasible
--------------------	------------------	-------------------	-------------------------	---

No facility	N/a	No parameters	\$ 0	\$ 0	☒
Platform	☒ Yes	Vehicle negotiation speed: 20 km/h ▼	\$ 0	\$ 0	☒
Kerb extensions	☒ Yes	Total crossing distance: 3.5 metres ?	\$ 0	\$ 0	☐
Median refuge	☒ No Only one trafficked lane	Direction 1 crossing distance: metres ? Median refuge width: metres ? Direction 2 crossing distance: metres ?	\$	\$	☐
Kerb extensions with median refuge	☒ No Median refuge not suitable	Direction 1 crossing distance: metres ? Median refuge width: metres ? Direction 2 crossing distance: metres ?	\$	\$	☐
Zebra only	☒ May require approval Road is one-lane one-way	No parameters	\$ 0	\$ 0	☒
Zebra with platform ? *	☒ May require approval Zebra may not be suitable	Applies vehicle negotiation speed from Platform above	\$	\$ 0	☒
Zebra with kerb extensions	☒ May require approval Zebra may not be suitable	Applies total crossing distance from Kerb extensions above	\$ 0	\$ 0	☐
Zebra with platform and kerb extensions ?	☒ May require approval Zebra may not be suitable	Applies vehicle negotiation speed from Platform and total crossing distance from Kerb extensions above	\$ 0	\$ 0	☐
Zebra with median refuge	☒ No Zebra may not be suitable Median refuge not suitable	Applies distances and refuge width from Median refuge above	\$	\$	☐
Zebra with kerb extensions and median refuge	☒ No Zebra may not be suitable Kerb extensions with median refuge not suitable	Applies distances and refuge width from Kerb extensions with median refuge above	\$	\$	☐

Signals	Yes	Signals activated by pedestrian call button? No	0	0	0
		Cycle time: 50 seconds	\$	0	0
		Percent of time in green pedestrian phase: 40 %	\$	0	0
Signals with kerb extensions	Yes	Applies parameters from Signals above, plus: Total crossing distance: 3.5 metres	\$	0	0
Grade separation	Maybe Max. of approach/posted speed < 75km/h	No parameters	\$	0	0

Calculate assessment

Facility assessment

	Suitable for site?	Pedestrian delay	Vehicle delay	Predicted crash rate	CSD	ASD	SISD			
Zebra with platform	May require approval	7 sec	1 sec	0.01 /year	79 m	22 m	47 m			
No facility	N/a	5 sec	0 sec	0.02 /year	79 m	22 m	47 m			
Platform	Yes	5 sec	1 sec	0.01 /year	79 m	22 m	47 m			
Zebra only	May require approval	7 sec	1 sec	0.02 /year	79 m	22 m	47 m			
Signals	Yes	9 sec	6 sec	0.01 /year	79 m	22 m	47 m			
Grade separation	Maybe	0 sec	0 sec	0.00 /year						
	Perceived delay	Perceived safety	Pedestrian delay cost	Pedestrian delay saving	Vehicle delay cost	Vehicle delay saving	Crash cost	Safety saving	Total benefits	BCR
Zebra with platform	B	C	\$ 151,000		\$ 68,000		\$ 24,000			
No facility	B	D	\$ 97,000	\$ 54,000	\$ 0	\$ 68,000	\$ 64,000	-\$ 40,000	\$ 81,000	Zero construction

										cost
Platform	B	D		\$ 97,000	\$ 54,000	\$ 39,000	\$ 28,000	\$ 34,000	- \$ 10,000	Zero construction cost \$ 72,000
Zebra only	B	C		\$ 151,000	\$ 0	\$ 28,000	\$ 39,000	\$ 64,000	- \$ 40,000	Zero construction cost - \$ 1,000
Signals	B	B		\$ 194,000	- \$ 43,000	\$ 180,000	- \$ 113,000	\$ 35,000	- \$ 12,000	Zero construction cost - \$ 168,000
Grade separation				\$ 0	\$ 151,000	\$ 0	\$ 68,000	\$ 9,000	\$ 15,000	Zero construction cost \$ 233,000

Notes

The best option is grade separation however this would not align with the pedestrian desire line.
The next best option in terms of perceived safety and pedestrian LOS is signals but this is the highest cost option, particularly in terms of delays to vehicles and pedestrians.
After grade separation, the best option in terms of total benefits is to provide no facility, however, it has the worst perceived safety, pedestrian level of service and crash cost. This option is not recommended as it does not concentrate pedestrian movements and provide a safe facility for people with disabilities.
After no facility, the best option in terms of total benefits is a platform, however, it has the worst perceived safety and pedestrian level of service. Perceived safety, pedestrian LOS and crash costs are improved with the addition of a zebra crossing to the platform but this increases delay costs.

File saved

Townsville Marine Tourism Precinct_1.1_03-09-2019.csv has been saved to your default download directory.

Reset all Fields

Townsville Marine Tourism Precinct_1.1_03-09-2019.csv

Export CSV File

Back to top

Disclaimer

The Australasian Pedestrian Crossing Facility Selection Web Tool ("the tool") is freely provided by **Austroroads** and is intended to help practitioners select an appropriate pedestrian crossing facility for a particular location. The tool is based on literature, and analytical and behavioural research coupled with a number of mathematical models. Its development is detailed in the Austroroads report [Development of the Pedestrian Facility Selection Tool \(PDF\)](#).

As with all mathematical models care must be taken to understand input limitations and background assumptions when interpreting the outputs. The tool does not replace professional engineering or planning advice and Austroroads does not accept any responsibility regarding the tool. While we have endeavoured to ensure the information output by the tool is appropriate, we make no representations or warranties of any kind about the completeness, accuracy, reliability, suitability or availability with respect to the outputs. Any reliance you place on such information is strictly at your own risk and it is your responsibility to check all information output by the tool.

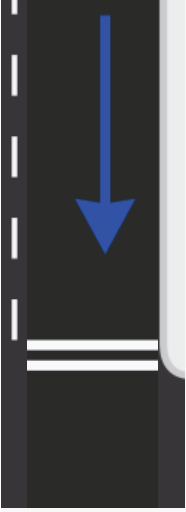
The tool should not be used to inform decision making in isolation when considering the form and location of pedestrian crossing facilities. Engineering judgement is required to consider the economic and other outputs produced by the tool alongside safety, mobility, social and environmental factors that are considered appropriate by the practitioner.

Version: [2.1.4](#)

ANNEXURE P
ACCESS CROSSING APCFST ASSESSMENT

Layout diagram

Peak non-sensitive pedestrian volume:	50	ped/hr	Crossing distance: 8.2 metres
Estimated daily pedestrian volume:	500	ped/day	
Average vehicle occupancy:	1.3	pers/veh	
Degree of pedestrian/turning vehicle conflict:	High		



Site characteristics

Exposed crossing distance: $8.2 + 1.2 + 8.2 = 17.6$ metres

Est. pedestrian crossing time (exposed): **14.7 seconds**

Total peak hourly vehicle flow: $140 + 163 = 303$ veh/hr

Model parameters [Show/Hide](#)

Walk speed of average sensitive pedestrians: 1 m/s

Walk speed of average non-sensitive pedestrians: 1.2 m/s

Average cost of pedestrian crashes: \$ 230156

Value of delay: \$ 29.77 /hr

Pedestrian conversion factor: 0.6

Vehicle conversion factor: 0.4

Economic assessment parameters

Evaluation days per annum: 250

Project lifetime: 30 years

Discount rate: 7 %

Economic update factors

Base date: June 2010

Update factor to current date: 1

Travel time costs/savings: 1

Vehicle operating costs/savings: 1

Crash costs/savings: 1

Expected crash reduction factors

Platform	47 %	Kerb extensions	35 %	Median refuge	56 %	Kerb extensions with median refuge	56 %	Zebra only	0 %	Zebra with platform	63 %	Zebra with kerb extensions	35 %	Zebra with platform and kerb extensions	63 %	Zebra with median refuge	56 %	Zebra with kerb extensions and median refuge	56 %	Signals	45 %	Signals with kerb extensions	45 %	Grade separation	86 %
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[Calculate feasibility](#)
[View the facility feasibility process \(PDF\) here](#)

☐ Automatically calculate when inputs are updated? [?](#)

Feasible facilities

	Suitable for site?	Built parameters	Construction cost	Annual maintenance cost	Show in final output? Select all/none/feasible
No facility	N/a	No parameters	\$	\$ 0	☒
Platform	No Too many lanes Not appropriate without formal median refuge	Vehicle negotiation speed: Please select	\$	\$	☐
Kerb extensions	No Not appropriate without formal median refuge	Total crossing distance: metres	\$	\$	☐
Median refuge	Yes	Direction 1 crossing distance: 7.9 metres Median refuge width: 1.8 metres Direction 2 crossing distance: 7.9 metres	\$ 0	\$ 0	☒
Kerb extensions with median refuge	Yes	Direction 1 crossing distance: 7 metres Median refuge width: 1.8 metres Direction 2 crossing distance: 7 metres	\$ 0	\$ 0	☒
Zebra only	No Intersection location Too many lanes Not appropriate without formal median refuge	No parameters	\$	\$	☐
Zebra with platform ?	No Zebra not suitable Platform not suitable	Applies vehicle negotiation speed from Platform above	\$	\$	☐

Zebra with kerb extensions	No Zebra not suitable Kerb extensions not suitable	Applies total crossing distance from Kerb extensions above	\$	\$	☐
Zebra with platform and kerb extensions	No Zebra not suitable Platform not suitable Kerb extensions not suitable	Applies vehicle negotiation speed from Platform and total crossing distance from Kerb extensions above	\$	\$	☐
Zebra with median refuge	No Zebra not suitable	Applies distances and refuge width from Median refuge above	\$	\$	☐
Zebra with kerb extensions and median refuge	No Zebra not suitable	Applies distances and refuge width from Kerb extensions with median refuge above	\$	\$	☐
Signals	Yes	Cycle time: 100 seconds Percent of time in green pedestrian phase: 40 %	\$ 0	0	☒
Signals with kerb extensions	Yes	Applies parameters from Signals above, plus: Direction 1 crossing distance: 7 metres Median width: 1.8 metres Direction 2 crossing distance: 7 metres	\$ 0	0	☒
Grade separation	No Intersection location	No parameters	\$	\$	☐

[Calculate assessment](#)

Facility assessment

	Suitable for site?	Pedestrian delay	Vehicle delay	Predicted crash rate	CSD	ASD	SISD
No facility	N/a	18 sec	0 sec	0.02 /year	147 m	22 m	47 m
Median refuge	Yes	3 sec	0 sec	0.01 /year	66 m	22 m	47 m
Kerb extensions with median refuge	Yes	2 sec	0 sec	0.01 /year	58 m	22 m	47 m

Signals	Yes	18 sec	0 sec	0.01 /year	147 m	22 m	47 m				
Signals with kerb extensions	Yes	18 sec	0 sec	0.01 /year	58 m	22 m	47 m				
	Perceived delay ?	Perceived safety ?	Pedestrian LOS ?	Pedestrian delay cost ?	Pedestrian delay saving ?	Vehicle delay cost ?	Vehicle delay saving ?	Crash cost ?	Safety saving ?	Total benefits ?	BCR ?
No facility *	C	F	F	\$ 147,000		\$ 0		\$ 45,000			
Median refuge	B	E	D	\$ 20,000	\$ 127,000	\$ 0	\$ 0	\$ 20,000	\$ 25,000	\$ 152,000	Zero construction cost
Kerb extensions with median refuge	B	D	D	\$ 16,000	\$ 132,000	\$ 0	\$ 0	\$ 20,000	\$ 25,000	\$ 157,000	Zero construction cost
Signals	C	B	B	\$ 143,000	\$ 4,000	\$ 0	\$ 0	\$ 25,000	\$ 20,000	\$ 24,000	Zero construction cost
Signals with kerb extensions	C	B	B	\$ 143,000	\$ 4,000	\$ 0	\$ 0	\$ 25,000	\$ 20,000	\$ 24,000	Zero construction cost

Notes

The best option in terms of total benefits and perceived delay is kerb extensions with median refuge, however, geometric requirement may prevent the provision of kerb extensions. The next best option in terms of total benefits and perceived delay is a median refuge. This option has poor perceived safety, however, it is expected to have the lowest crash costs. It is likely that one or more median refuges could be provided on the access in association with building columns without restricting vehicle movements and at minimal cost.

File saved

Townsville Marine Tourism Precinct_5_03-09-2019.csv has been saved to your default download directory.

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Version: [2.1.4](#)

ANNEXURE Q
TRAFFIC IMPACT ASSESSMENT CERTIFICATION

CERTIFICATION OF TRAFFIC IMPACT ASSESSMENT REPORT
REGISTERED PROFESSIONAL ENGINEER QUEENSLAND
FOR

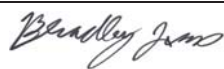
Project Title	Townsville Marine Tourism Precinct – Ferry Terminal Consolidated Traffic Engineering Report
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As a professional engineer registered by the Board of Professional Engineers of Queensland pursuant to the *Professional Engineers Act 2002* as competent in my areas of nominated expertise, I understand and recognise:

- The significant role of engineering as a profession; and that
- The community has a legitimate expectation that my certification affixed to this engineering work can be trusted; and that
- I am responsible for ensuring its preparation has satisfied all necessary standards, conduct and contemporary practice.

As the responsible RPEQ, I certify:

- I am satisfied that all submitted components comprising this traffic impact assessment, listed in the following table, have been completed in accordance with the Guide to Traffic Impact Assessment published by the Queensland Department of Transport and Main Roads and using sound engineering principles; and
- Where specialised areas of work have not been under my direct supervision, I have reviewed the outcomes of the work and consider the work and its outcomes as suitable for the purposes of this traffic impact assessment; and that
- The outcomes of this traffic impact assessment are a true reflection of results of assessment; and that
- I believe the strategies recommended for mitigating impacts by this traffic impact assessment, embrace contemporary practice initiatives and will deliver the desired outcomes.

Name	Bradley Jones
RPEQ No.	19986
RPEQ Competencies	Civil
Email	Bradley.Jones@premise.com.au
Postal Address	PO Box 1110 TOWNSVILLE QLD 4810
Signature	
Date	3 September 2019

Traffic impact assessment components to which this certification applies	☒
1. Introduction	
Background	☒
Scope and study area	☒
Pre-lodgement meeting notes	☒
2. Existing Conditions	
Land use and zoning	☒
Adjacent land uses / approvals	☒
Surrounding road network details	☒
Traffic volumes	☒
Intersection and network performance	☒
Road safety issues	☐
Site access	☒
Public transport (if applicable)	☒
Active transport (if applicable)	☒
Parking (if applicable)	☐
Pavement (if applicable)	☐
Transport infrastructure (if applicable)	☐
3. Proposed Development Details	
Development site plan	☒
Operational details (including year of opening each stage and any relevant catchment / market analysis)	☒
Proposed access and parking	☒
4. Development Traffic	
Traffic generation (by development stage if relevant and considering light and heavy vehicle trips)	☒
Trip distribution	☒
Development traffic volumes on the network	☒
5. Impact Assessment and Mitigation	
With and without development traffic volumes	☒
Construction traffic impact assessment and mitigation (if applicable)	☐
Road safety impact assessment and mitigation	☒
Access and frontage impact assessment and mitigation	☒
Intersection delay impact assessment and mitigation	☒
Road link capacity assessment and mitigation	☐
Pavement impact assessment and mitigation	☐
Transport infrastructure impact assessment and mitigation	☐
Other impacts assessment relevant to the specific development type / location (if applicable)	☒
6. Conclusions and Recommendations	
Summary of impacts and mitigation measures proposed	☒
Certification statement and authorisation	☒



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AGRICULTURE



WATER